

Ahoy!

\$2.95/ CAN. \$3.35 APR. 1987

Cup Lock & F14

...PREVIEW OF NEW AMIGA 2000!...



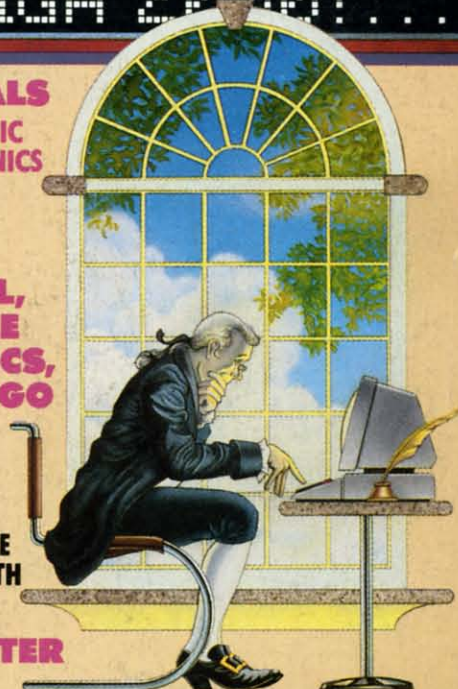
INSIDE THE AMIGA 2000

- 1 MEG RAM, KICKSTART IN ROM
- OPTIONAL IBM COMPATIBILITY
- INTERNAL EXPANSION FOR AMIGA & PC XT/AT

FRACTALS GEOMETRIC PYROTECHNICS

COMAL, TURTLE GRAPHICS, AND LOGO

MORE
READABLE
BASIC WITH
LIST
FORMATTER



PRESS BOX VIEW OF NEW
BASEBALL
PROGRAMS
AND
OTHER
GAME
REVIEWS

C-64 & C-128 GAMES

- PIEMAN
- SCRAMBLER
- PLANET DUEL
- LAPS



C-128 ICON DATABASE

MD 21673

BDM

GR3

040

JAN 1988
21673C0S220R800M AH0Y

TRAPPE

BOX 20

RR 2

ROBERT CROSWELL

21673C0S220R800M

040



Super Solutions 2



**Pocket
Writer 2**
Word Processor



**Pocket
Planner 2**
Spreadsheet



**Pocket
Filer 2**
Database

The Best Just Got Better

We just did something only the best can do! We made our award winning* software for the Commodore™ 128 and 64 computers even better!

Introducing... Pocket Writer 2/word processor **Pocket Planner 2**/spreadsheet **Pocket Filer 2**/database

Our new Pocket 2 series offers features usually found only in much more sophisticated applications software. Features that include: compatibility with the new GEOS operating system†, ability to work with the Commodore RAM expander to allow a RAM disk, mouse support with pull down menus, 1571 burst mode for faster file loading, increased support for two single disk drives, automatic configuration for screen color, format and printer selection†.

Sophisticated software, yes, and still easy to use. You can be up and running in under 30 minutes even if you haven't operated a computer before.

Now, when you upgrade your Commodore™ 64 to a 128, Pocket software helps make it a breeze. The new Pocket 2 software has both 128 and 64 applications on the same disk. So when you buy one you are actually buying two software packages. The cost only \$59.95 (U.S.).

**Serious Software
That's Simple to Use**

Reader Service No. 109

You can buy all three Pocket 2 applications, Pocket Writer 2, Pocket Planner 2 and Pocket Filer 2 in one convenient Superpak for the low price of only \$99.95 (U.S.). A super way to discover all the integrated features of Pocket 2 software and save almost eighty dollars.

As a companion to Pocket Writer 2, a Dictionary Disk containing 32,000 words (expandable to 40,000) is available. The cost \$14.95 (U.S.).

For those of you who have already discovered the many benefits of owning Pocket software; we offer all registered owners upgrade Pocket 2 software for only \$19.95 (U.S.) plus 3.00 (U.S.) shipping and handling! Available only by writing to Digital Solutions Inc.

*Commodore's Micro-computers Magazine, independent reviewers, rated the original Pocket Writer 128/64 and Pocket Planner 128/64 software the "Annual Best of 1986" in the productivity category.

International Distributor Enquiries to:



**Digital
Solutions
Inc.**

2-30 Wertheim Court
Richmond Hill, Ontario
Canada L4B 1B9
Telephone (416) 731-8775
Telex 06-964501
Fax (416) 731-8915

**Superpak:
The Solution That
Saves Money!**



Economical; \$179.85 (U.S.) worth of software for only **\$99.95 (U.S.)**

Canadian Dealer Enquiries:
Ingram Canada Ltd.
1-416-738-1700

Mail orders:
Crystal Computer Inc.
in Michigan
1-517-224-7667
outside Michigan
1-800-245-7316

Commodore is a registered trademark of Commodore Business Machines Inc.
† Features available for Commodore 64™.
©1986 Digital Solutions Inc.

Ahoy!

CONTENTS

DEPARTMENTS

A View from the Bridge... <i>of the April issue of Ahoy!</i>	7
Scuttlebutt... <i>new C-64 peripherals from Commodore, and more.</i>	8
Reviews... <i>current software run through the Ahoy! wringer.</i>	65
Tips Ahoy!... <i>not a foul one in the bunch.</i>	72
Commodares... <i>we can smell the wood chips burning already.</i>	86
Program Listings... <i>games and utilities to keypunch and enjoy.</i>	93

FEATURES

Rupert Report: Fractals <i>by Dale Rupert*</i>	20
Entertainment Software Section <i>(contents on page 41)</i>	41
Amiga Section: Preview of the Amiga 2000	53
COMAL Column: COMAL, Turtle Graphics, and Logo	77

*Includes program: *Fractal Maker* for the C-128

PROGRAMS

Pieman for the C-64 <i>by Bob Blackmer</i>	15
Scrambler for the C-64 <i>by Tony Brantner</i>	31
Planet Duel for the C-128 <i>by Cleveland M. Blakemore</i>	34
Infocflow for the C-128 <i>by Cleveland M. Blakemore</i>	37
Laps for the C-64 <i>by James C. Hilty</i>	63
Extended Background Mode for the C-128 <i>by R. Harold Droid</i>	82
List Formatter for the C-128 <i>by Shawn K. Smith</i>	85
Bug Repellents for the C-64 and C-128 <i>by Kleinert & Barron</i>	94
Flankspeed for the C-64 <i>by Gordon F. Wheat</i>	95

Cover art by James Regan and Josie Yee

President/Publisher
Michael Schneider

Editor
David Allikas

Art Director
JoAnn Case

Managing Editor
Michael R. Davila

Senior Editors
Tim Little
Tim Moriarty

Production Director
Laura Pallini

Technical Editors
David Barron
Bob Lloret

Consulting Editors
Ben Bova
Morton Kevelson
Dale Rupert

Entertainment Editor
Arnie Katz

Art Production
Christopher Carter
Victoria Green

Bulletin Board SYSOP
B.W. Behling

Circulation Director
W. Charles Squires

Advertising Director
Lynne Dominick

Director of Promotion
Mark Kammerer

Controller
Dan Tunick

Managing Director
Richard Stevens

Advertising Representative
JE Publishers' Representative
6855 Santa Monica Blvd., Suite 200
Los Angeles, CA 90038
(213) 467-2266
Boston (617) 437-7628
Dallas (214) 660-2253
New York (212) 724-7767
Chicago (312) 445-2489
Denver (303) 595-4331
San Francisco (415) 864-3252

ISSUE NO. 40 APRIL 1987
Ahoy! (ISSN #8750-4383) is published monthly by Ion International Inc., 45 W. 34th St., Suite 407, New York, NY, 10001. Subscription rate: 12 issues for \$23.00, 24 issues for \$44.00 (Canada \$30.00 and \$55.00 respectively). Second class postage paid at New York, NY 10001 and additional mailing offices. © 1986 by Ion International Inc. All rights reserved. under Universal International and Pan American Copyright conventions. Reproduction of editorial or pictorial content in any manner is prohibited. No responsibility can be accepted for unsolicited material. Postmaster, send address changes to Ahoy!, 45 W. 34th Street, Suite 407, New York, NY 10001. Direct all address changes or matters concerning your subscription to Ahoy!, P.O. Box #341, Mt. Morris, IL 61054. All editorial inquiries and software and hardware to be reviewed should be sent to Ahoy!, 45 W. 34th St., Suite 407, New York, NY 10001.

PRO-TECH TRONICS

C-64 COMPUTER



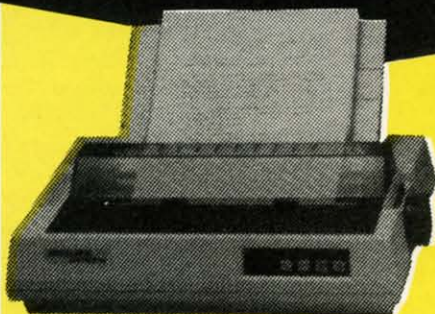
\$**99**

*WITH PURCHASE OF SPECIALLY
PRICED SOFTWARE PACKAGE

FACTORY SERVICED
FULL WARRANTY

FREE HOME TRIAL

PRINTER



\$**149**

SEIKOSHA

NEAR LETTER QUALITY

- 100 CPS Draft Mode
- 20 CPS NEAR LETTER QUALITY MODE
- Commodore Ready

PRINTER

Star
micronics

SG-10-C
\$**198**



COMMODORE READY

NEAR LETTER QUALITY

- 120 CPS Draft
- 30 CPS NEAR LETTER QUALITY
- Includes Both...
 - TRACTOR FEED
 - FRICTION

FREE TRIAL PERIOD

CALL TODAY
OPEN 7 DAYS
A WEEK &
EVENINGS

1-800-345-5080

CS

COMMODORE

C-128



\$199

*WITH PURCHASE
OF 1571 DISK DRIVE

FACTORY SERVICED
FULL WARRANTY

FREE TRIAL PERIOD

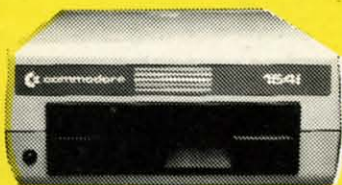
AMIGA



\$799

*MONITOR \$50 ADDITIONAL

DISK DRIVE



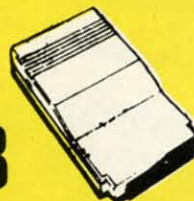
1541
COMMODORE

\$148

MODEMS

300
BAUD

\$28



\$98

1200 BAUD
HAYES
COMPATIBLE



POWER SUPPLY JOY STICKS

C-64



\$39



\$9

CABLE TV

NO
PAY TV?
CONVERTERS/
DECODERS

- JERROLD
- OAK
- HAMLIN



RADAR DETECTOR



RETAIL
\$249

MAXON
SUPERHET

\$78

FREE HOME TRIAL

QUICK DELIVERY



C.O.D.

SCHOOL P.O.'s ACCEPTED
Reader Service No. 104

PRO-TECH-TRONICS

6860 Shingle Creek Parkway #201
Minneapolis, MN 55430
(612) 560-6603

COMMODORE

C-64-C COMPUTER

INCLUDES
GEOS



NEW!

C-64-C

\$168

*WITH PURCHASE OF DISK DRIVE

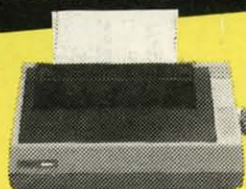
PRINTERS

803-C
COMMODORE

\$139



star
MICROELECTRONICS



\$198

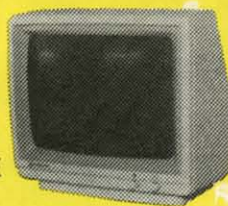
LETTER QUALITY DAISYWHEEL

MONITORS

RETAIL
\$120

\$59

MONOCROME
MONITOR



RETAIL \$299

\$139

FULL COLOR



RETAIL
\$400

\$199

RGB



**CALL
TODAY!**

PRO-TECH-TRONICS

6860 Shingle Crk. Pkwy. #201
Minneapolis, MN 55430
(612) 560-6603

QUICK DELIVERY



Reader Service No. 104



OPEN 7 DAYS
A WEEK &
EVENINGS

1-800-345-5080

VIEW FROM THE BRIDGE

Once upon a time in the home computer world, companies took turns releasing the Ultimate Machine. One manufacturer's pride and joy would barely reach the shelves before a more powerful, more cost-efficient, or otherwise superior rival would be announced.

Then came the Amiga 1000. We spent the following year and a half waiting for it to be eclipsed. It didn't happen.

But—what a great country this is. To preserve the competitive spirit of the microcomputer marketplace, Commodore has surpassed its own creation!

While we saw the Amiga 2000 at a closed-door presentation in Commodore's New York offices in December, we were bound to silence until after the machine's late February release date. But as of this issue, the story can be told—and is told in graphic detail by Morton Kvelson, beginning on page 53.

You can't buy an Amiga 2000 yet—but there's plenty in this issue of *Ahoy!* to keep you busy on your 64 and 128 until you can:

- What a dirty trick Dale Rupert's been playing on us these past three years. We thought we were just learning programming from the *Rupert Report*, and having a whale of a time doing it. But it recently dawned on us that the sneak has been reteaching us all the high school and college math we forgot, and many new concepts besides. The painless learning process continues this month with a lesson on *Fractals*, along with a program for creating recursively generated curves. (Turn to page 20.)

- Making good on his promise to cover a great deal besides COMAL in our new column devoted to the language, Richard Herring discusses *Turtle Graphics*, *COMAL*, and *Logo* this month. (Turn to page 77.)

- When Cleveland Blakemore told us he was working on his first productivity program for *Ahoy!*, we began counting the days. We knew that if he programmed it to the same exacting standards as *Vault of Terror*, *The Last Ninja*, and other classic games, the result would be too amazing to picture. As it turned out, Cleve provided the pictures—with *Infocrow*, an icon-driven database for the C-128. (Turn to page 37.)

- But in embarking on a second programming career, Cleve has not deserted his specialty. This issue also features *Planet Duel*, a two-player space battle in BASIC 7.0. (Turn to page 34.)

- If the bags of gold distributed throughout Tony Brantner's latest game don't turn you into a *Scrambler*, the laser-firing robot sentries will! (Turn to page 34.)

- Shawn K. Smith's *List Formatter* rearranges crunched C-128 code into a more readable format without sacrificing speed. (Turn to page 85.)

- Bob Blackmer dishes up *Pieman*, requiring you to cope in the best Lucy Ricardo tradition with a conveyor belt gone bonkers. (Turn to page 15.)

- James C. Hilty's *Laps* whips you around a 3-D track as you and another player compete for entry in the Ion International 500. (Turn to page 63.)

- R. Harold Droid places the VIC chip's *Extended Background Mode*—not supported by BASIC 7.0—at the disposal of C-128 programmers. (Turn to page 82.)

- Our *Entertainment Software Section* takes a patriotic turn this month with *Commodoring for the Cup*, profiling the new America's Cup yacht racing simulations from Electronic Arts and Mindscape, and *New Baseball Games in Town*, running down this season's additions to the national pastime. Also featured are full-length looks at *Video Vegas*, *Howard the Duck*, and *Titanic: The Recovery Mission*. (Turn to page 41.)

- As usual, *Tips Ahoy!* provides a cream of the crop cross section of the hundreds of programming and hardware hints we receive each month (turn to page 72); *Commodores* offers several evenings' worth of intellectual delight or living hell—depending on your perspective (turn to page 86); and *Scuttlebutt* capsulizes the most current prerelease information on software, peripherals, and other items for Commodore users. (Turn to page 8.)

There's more waiting for you inside. And we'll be waiting to hear what you think.

—David Allikas

Businesses Need An Edge! Commodore Computer Owners Have One...



SERIAL BOX™

64 K SERIAL PORT PRINT BUFFER

A SERIAL BOX lets you print one job while you are working on another.

**No Waiting... More Computing...
More Output... Good Business.**

ONLY \$99⁹⁵ (suggested list price)

Price Effective March 1, 1987

You can dump 15 pages of text in 2½ minutes

GEOS™ COMPATIBLE

Dealer Inquiries Requested.

CALL 1-800-228-7264 FOR ORDERS AND INFORMATION
IN PENNSYLVANIA CALL (215) 622-5495 OR WRITE:

R. J. Brachman Associates, Inc.
P.O. Box 1077 Havertown, PA 19083

Foreign shipping and handling: Canada/Mexico add \$5.00;
all others add \$10.00.

VISA, MC, Check or Money Orders accepted. C.O.D. add \$2.50
PA residents add 6% (PLEASE ALLOW 4 TO 6 WEEKS FOR DELIVERY)

*FONT FACTORY is a font design utility program.
GEOS is a registered trademark of Berkeley Software.

Prices subject to change without notice.



Reader Service No. 150

AHOY! 7

AMIGA MUSIC • NEW PRINTERS • C-128 DESIGN • SUPPORT FOR MSD DRIVE, B-128 • MIDI SEQUENCER • GAMES FROM MICROPROSE, INFOCOM, ACTIVISION • LESSON PLANNER • CABLES FOR PLUS/4, 128 • 1200 BAUD MODEM • COMMODORE PERIPHERALS AND 128D

COMMODORE PERIPHERALS

While the biggest news to come out of Commodore this month is detailed beginning on page 53 of this issue, three new peripherals were showcased at January's Consumer Electronics Show:

- The Commodore 1581 3.5" Disk Drive (\$399) provides C-64, C-128, Plus/4, and C-16 users with faster data transfer (three times that of the 1541), and greater storage capacity (808K). (Another advantage of 3½" disks is of course the protection afforded by their hard shells—until you have to shell out for them.)

- The 1764 RAM Expansion (\$129) plugs into the expansion port of a C-64 to add 256K of memory. Included are two RAM disk programs, one for use with GEOS and one without, for utilizing the RAM module as a pseudo-disk drive for instantaneous loading and saving of programs.

- The Commodore 1351 Mouse (\$49.00) for the 64 or 128 offers a choice of joystick or proportional operating mode, the latter providing for a faster, more responsive onscreen pointer.

Commodore Business Machines, Inc., 215-431-9100 (see address list, page 14).

128D AND PC CLONES

Commodore also announced the release in the United States of three machines previously available in the rest of the world:

- While 100% C-128 compatible, the 128D (\$550) features IBM AT-like styling with an in-console disk drive and a detachable keyboard. The main benefit is the unit's smaller footprint, with additional space saved by

Commodore's 1764 RAM Expander increases the capacity of the C-64 to five times its unexpanded size, adding 256K RAM.

**READER
SERVICE NO. 157**



The Commodore 1581 3.5" disk drive has a data transfer rate three times that of the 1541, and over 800K storage capacity per disk.

**READER
SERVICE NO. 158**

The 128D sports an in-console disk drive and a detachable keyboard. But despite the new configuration, it is 100% C-128 compatible.

**READER
SERVICE NO. 159**



placement of the monitor on top of the CPU.

- The PC10-1 (\$999) and PC10-2 (\$1199), differing only in the number

of included floppy drives, each feature IBM compatibility and built-in serial and parallel ports and monochrome/color display cards.

CABLES & ACCESSORIES HARDWARE & SOFTWARE



6 Ft. monitor Extension, 5 pindin/2RCA.....	\$8.95
6 Ft. monitor Extension, 5 pindin/3RCA.....	\$8.95
6 Ft. monitor Extension, 5 pindin/4RCA.....	\$9.95
6 Ft. 6 Pindin Male/Male.....	\$6.95
9 Ft. 6 Pindin Male/Male.....	\$8.95
18 Ft. 6 Pindin Male/Male.....	\$16.95
6 Ft. 6 Pindin Male/Male.....	\$6.95
6 Ft. Centronics, Male/Male.....	\$14.95
6 Ft. Centronics, Male/Female.....	\$14.95
6 Ft. RS232, 25 Pin, Male/Female.....	\$14.95
9 Ft. 6 Pindin, Male Rt. Angle/Male.....	\$9.95
12 Ft. Joystick Extension.....	\$8.95
6 Ft. 90° Angle 1541 Powercord.....	\$9.95
7 Ft. Modem Extension Cord (Plug-Plug).....	\$3.95
15 Ft. Modem Extension Cord (Plug-Plug).....	\$5.95
25 Ft. Modem Extension Cord (Plug-Plug).....	\$6.95
Handy Fuse Puller.....	\$1.95
IC Puller (No more poked fingers).....	\$4.95
Hi-Res Stereo Headphones (CD ready, Gold contacts).....	\$8.95
Save your Joystick Ports from damage with this Port Extender.....	\$6.95

RS232 Jumper Box

Reconfigure your RS232 port. Fix mismatched cables. Plug type. **\$19.95**

RS232 Gender Changer

Change your port either way. Male/Male **\$8.95** Fem/Fem **\$8.95**

RS232 Port Minitester

Diagnose RS232 communication problems. 7 LED Lights. **\$19.95**

The ULTRAVOX Sound System

This system adds an exciting new dimension to all of your sound producing software! 100% stereo sound from your Commodore 64. It even has a built-in amp to power speakers directly.

- No soldering
- 100% External hardware

- Also works on VCR & TV

was \$49.95 now **\$39.95**

RS232 BREAKOUT BOX

No batteries required, uses power from RS232 signal. 2 color LED's. Reconfigure or solve RS232 problems. Comes with a DB25 Male and DB25 Female.

\$49.95

DI-SECTOR (Latest Version)

Di-sect all of the latest software, make archival backups of the hard-to-get stuff. This is so much more than a copy program! It has all the copiers you want, plus an incredible file copier, ML monitor, sector editor, etc. Plus a parameter copier with over 140 parameters.

Entire Utility System **only \$39.95**

5 TERMINAL PHONE

EXPANDER

No more unplugging. Hook up modems, phones, auto dialers answering machines, etc. all at once! **\$14.95**



128 CABLE

80 column on the C128 with the 1701/1702 monitor monochrome w/sound. Save big money. **\$9.95**

C128 Reference Book \$15.95

Over 75 easy to read charts and tables. 261 pgs. of solid information. Not one wasted page. Lays flat for easy reading. Color coded, always find what you need. An incredible compilation of information. Guaranteed.



Protection Revealed Book \$19.95

Learn to protect and unprotect your software. For the new user, and experimenter. Includes basic program security. FREE disk included. (21 Utilities)

Disk Cleaner \$8.95



The ULTRAVOX MASTER SYSTEM

Includes: one ULTRAVOX two speakers 1 headphones **only \$59.95**



2764 E PROMS

These are the ones! The chips you want, at a price you love. **\$5.95**



6 OUTLET STRIP

Why pay more? These units have a 15 AMP breaker illuminated switch and heavy duty cord. **ONLY \$11.95**

\$ SAVER SWITCH \$

Connects two computers to one printer or disk drive, or share your drive and printer between two computers. Link two printers to one computer. Switch from one device to another.

Mod. 1: Two 6 pindin female sockets and 4' cable
Mod. 2: Three 6 pindin female sockets; can be used with most printer interfaces. **\$29.95**

\$ SUPER SAVER SWITCH \$



For school or business.

4 computers to 1 device

\$79.95

PARALLEL A/B SWITCH

36 pins switched, female connectors, gold contacts, high-quality push-button switch. **\$44.95**

RS232 A/B SWITCH

25 pins switched, DB 25 connectors, high-quality push-button switch. **\$44.95**

Quality POWER CENTER

EMI FILTERING
15 AMP Breaker
Surge Protection



Lighted Rocker Switches
Master ON/OFF Switch
Heavy Metal Case

Includes a switch for computer, monitor, printer, Aux 1, Aux 2.

Please add \$5.00 S&H for this item.

\$59.95



PRECISION PERIPHERALS & SOFTWARE

Call TODAY!

P.O. Box 20395
Portland, Ore. 97220

DEALERS and SCHOOLS WELCOME
Add \$2.00 shipping & handling. VISA, M.C.

503/254-7855

Commodore Business Machines, Inc., 215-431-9100 (see address list, page 14).

C-64/128 AND AMIGA GAMES

The Augusta and Pinehurst courses are included on Access Software's *Famous Courses of the World* (\$19.95), for use with *Leader Board* for the C-64. Each hole reproduces the distance, traps, water hazards, and rough of these courses.

Access Software, 801-298-9077 (see address list, page 14).

Tom Clancy's "Red Storm Rising" will be adapted for MicroProse by Sid Meier (*F-15 Strike Eagle*, *Silent Service*) sometime in late 1987. The game will be the first of a possible series based on the million-selling novel.

MicroProse, 301-771-1151 (see address list, page 14).

Five C-64 arcade entertainments from Mindscape, each \$29.95:

Uridium pits you against a squadron of Super-Dreadnought ships aiming to deplete your galactic sector's mineral resources.

Commodore's
PC10-1 and
dual drive
PC10-2 (pic-
tured) are IBM
clones featur-
ing built-in
parallel and se-
rial ports and
monochrome/
color display
cards.

READER
SERVICE NO. 160



Trailblazer lets one or two players race soccer balls through networks of changing color grids on a split screen. 20 fixed courses and a random course are included.

Parallax puts you and four other astronauts on an alien planet, where you must thwart an imminent attack on Earth.

Uchi Mata lets martial artists practice all the major judo throws while competing against another player or the computer.

FIST: The Legend Continues pits players against Ninja assassins, shoguns, warriors, mercenaries, and panthers on over 100 puzzle- and trap-filled screens.

Mindscape, Inc., 312-480-7667 (see address list, page 14).

The first release in Activision's Solid Gold series, featuring two old standards in one package for under \$15, will be *Pitfall!* and *Demon Attack*.

Activision, Inc., 415-960-0410 (see address list, page 14).

New from Infocom:

Hollywood Hijinx worthy of the worst "B" movies are what you'll be dragged into as you search the sprawling Malibu home of your deceased movie mogul uncle for the ten treasures hidden there. If you find them all in one night, the shooting match is yours. For the 64 (\$34.95) and Amiga (\$39.95).

Douglas Adams' *Bureaucracy* entangles the gamer in miles of red tape, starting with a bank's refusal to acknowledge your change-of-address form and leading, just as you'd expect, to a tree in the Zalagasan jungle (among other places).

Zork I, II, and III are now available in a single package as *The Zork Trilogy*. For the C-64; \$59.95.

Infocom and science museums throughout North America are hosting a series of marathon gaming sessions for high school students, with the first team to solve the designated text adventure winning a personal computer for its school. None were scheduled far enough in advance for

SAVE WITH THE AHoy! DISK MAGAZINE

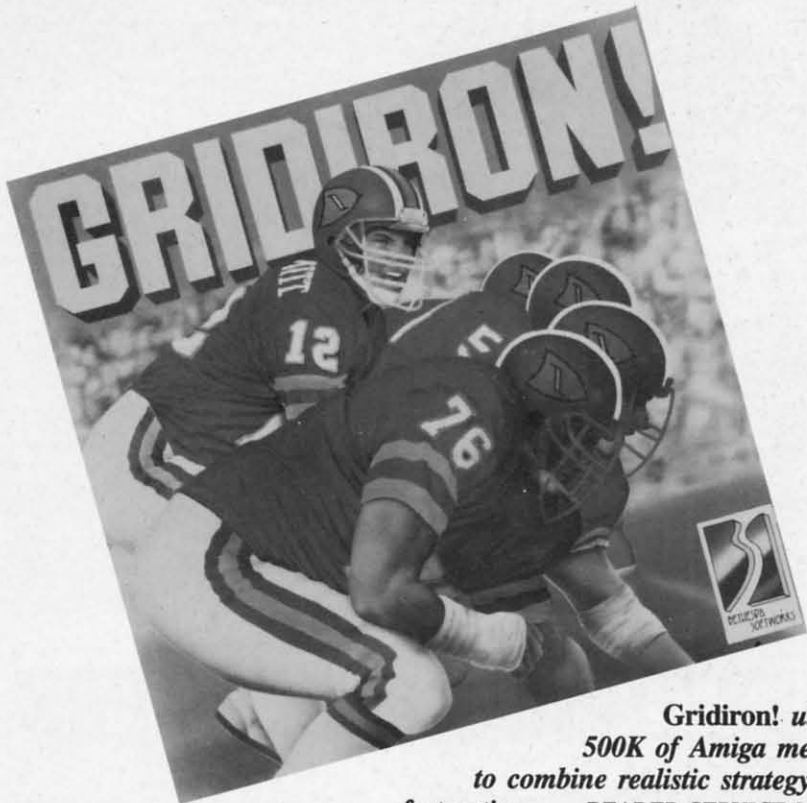
The money-saving subscription rates for *Ahoy!* magazine and the *Ahoy!* program disk are now even lower!

If you subscribe to the *Ahoy! Disk Magazine*—magazine and disk packaged together—you'll receive the two at substantial savings over the individual subscription prices!

YEARLY SINGLE ISSUE PRICE (12 ISSUES)		SEPARATE SUBSCRIPTION PRICE (12 ISSUES)		AHoy! DISK MAGAZINE 12 ISSUES \$97
Magazine:	\$ 35.40	Magazine:	\$ 23.00	
Disk:	\$107.40	Disk:	\$ 79.95	
TOTAL:	\$142.80	TOTAL:	\$102.95	

Use the postpaid card bound between pages 66 and 67 of this magazine to subscribe. (Canadian and foreign prices are higher.)

The *Ahoy! Disk Magazine* is also available at Waldenbooks and B. Dalton's bookstores, as well as other fine software outlets.



**Gridiron! utilizes
500K of Amiga memory
to combine realistic strategy with
fast action. READER SERVICE NO. 161**

us to report on here, but a call to Infocom will procure you the latest dates and locations.

Infocom, Inc., 617-492-6000 (see address list, page 14).

The 500K *Gridiron!* (\$69.95) lets Amiga users set 11 individual player characteristics, including the speed and strength of offensive and defensive players, and control the action as it occurs in real time. All players move according to instructions across a detailed playing field, accompanied by digital audio sound effects recorded at a live game. Plays may be taken straight from the playbook (consisting of 20 offense and 20 defense) or modified.

Bethesda Softworks, 301-469-7061 (see address list, page 14).

From Electronic Arts:

As an agent of an organization known only as The Foundation, the Amiga user seeks to *Return to Atlantis* (\$49.95) by completing 14 underwater missions in various international locales. The two-disk graphic adventure contains over 40,000 words of text.

Co-authored by one of baseball's winningest managers, *Earl Weaver Baseball* for the Amiga (\$49.95) lets the skipper set lineups, trade and

draft players, design his own ballpark, and assemble an all-star team. Special TV effects like slow motion, freeze frame, and instant replay make for more realistic gameplay. Earl's advice is available in the program for consultation on key decisions.

The *PHM Pegasus* combat simulation for the 64 (\$39.95) puts players in control of a hydrofoil missile craft as they battle enemy vessels in eight water war assignments.

50% larger in code size and more challenging than its predecessor, *The Bard's Tale II: The Destiny Knight* (\$39.95) centers around the C-64 gamer's attempt to find and reassemble the fragments of the Destiny Wand and restore the Realm to peace and prosperity. (Additionally, the original *Bard's Tale* has been released in an enhanced Amiga version for \$49.95.)

EA has launched its new Amazing Software line of under-\$20 games for the teen male market with *Dan Dare: Pilot of the Future*, described as "the first interactive comic book." Each C-64 screen becomes a comic book panel that the user controls, with captions, 3-D graphics, mazes, puzzles, fist fights, and a soundtrack.

Finally, the following new addi-

"COMAL seems to be the ideal language to use in the middle school." - Robert Patry

"COMAL is the optimal educational computing language." - Jim Ventola

"If languages interest you, this one is well worth a look ... You may find that it's just what you have been looking for." - Jim Butterfield, COMPUTE! magazine

"COMAL was just what I was looking for." - Colin Thompson, RUN magazine

"I don't have enough space to list all the good points!" - Noland Brown, Midnite Software Gazette

"I can recommend a better, faster, and cheaper programming language ... the most user friendly language around." - Mark Brown, INFO magazine

"Combines some of the best features of languages like Logo, Modula, Pascal, and Ada in an easy to use format." - Ahoy magazine

"COMAL seems to be bringing back an interest in programming." - G Stafford

Find out for yourself. Just send us a 39 cent stamped self addressed envelope. We'll send you our 24 page COMAL information booklet.

COMAL Users Group USA Ltd
6041 Monona Drive, Room 111
Madison, WI 53716
phone: (608) 222-4432

Get a FREE **QuantumLink™** Starter Kit When You Subscribe to AHOY!



A SPECIAL OFFER TO AHOY! READERS

With your FREE QuantumLink Starter Kit you can connect to a useful and fun online network at a very affordable price. QuantumLink will help you get the most out of your Commodore 64® or 128™. Here's how.

The ONLY official Commodore supported online service.

You'll have access to Commodore services including a hotline for getting fast answers to your questions from experts, online information, user group support, and "live" conferences and forums with Commodore engineers and experts. Because QuantumLink is specially designed for Commodore users, all the services are carefully selected to be of interest to you.

Hundreds of exciting services.

Get over 4,000 Commodore software programs. Play games with people from all over the country, including soon-to-be-released Lucasfilm's Habitat™. Preview "hit" software before you buy it. Book travel reservations, and much, much more!

Easy to use AND affordable.

With QuantumLink, you don't have to memorize any complicated commands. Colorful menus and help screens make it very easy to connect to and use QuantumLink.

And QuantumLink is the lowest priced full-service network. For only \$9.95 a month you can access a wide range of services including up-to-the-minute news, the Grolier's Academic American Encyclopedia™, entertainment news and features as often as you like

— for no extra charge! Special "Plus" services cost only 6 cents per minute. But your first hour of "Plus" time every month is FREE. No surcharges for communications or 1200 baud access either!



Habitat: ™ and © 1986 Lucasfilm Ltd. All Rights Reserved. Used Under Authorization.

Get a 300 baud auto-dial modem for only \$24.95!

To use QuantumLink you'll need a modem. You can now get a 300 baud auto-dial modem from QuantumLink at a special low price of \$24.95! Just use the order form below.

Order your AHOY! subscription today and get your FREE QuantumLink Starter Kit!

☐ **YES!** Sign me up for a subscription to AHOY! Plus send me my FREE QuantumLink Starter Kit.

Choose one:

☐ 12 issues of AHOY! for \$23.00 (\$30.00 in Canada)

☐ 24 issues of AHOY! for \$44.00 (\$55.00 in Canada)

☐ **YES!** I also need a modem. Send me a 300 baud auto-dial modem for \$24.95. (Please allow 4-6 weeks for delivery.)

Name

Address

City, State, Zip

Phone

☐ Check or money order enclosed for \$
(Make payable to Ion International Inc.)

Mail this coupon to:

AHOY!/Q-Link Subscription Offer
c/o Ion International Inc.
45 W. 34th St. - Suite 407
New York, NY 10001



QuantumLink™

This offer is valid through 12/31/87.

Reader Service No. 122

tions to EA's line of repackaged, under-\$15 Software Classics, some of which we can remember bouncing on our knee mere months ago: *Archon II: Adept*, *Skyfox*, *Ultimate Wizard*, *Movie Maker*, *Financial Cookbook*, and *Mind Mirror*.

Electronic Arts, 415-960-0410 (see address list, page 14).

THE B-128 LIVES

For sheer shock value, we thought we'd never top last month's announcement of new software for the PET 8032, put to sleep years ago by Commodore. But we're able to do it easily this issue with the announcement of the Chicago B-128 Users Group International. The organization is dedicated to the support of the computer that Commodore itself supported for only a few weeks following its release in 1983, before withdrawing it in favor of the C-64. Actually in operation for over a year, CBUG has made available working co-processors, hires boards, and previously shelved software, along with publishing a quarterly newsletter of over 80 pages. B-128 owners should contact the group for information.

Chicago B-128 Users Group, 414-743-4151 (see address list, page 14).

MSD DRIVE SUPPORT

On the subject of adopting orphans, David W. Martin has written and published *The MSD DOS Reference Guide* for owners of MSD single and dual drives (no longer being manufactured). Provided are commented RAM and source code ROM memory maps, plus a number of program listings. Price is \$20 for the book, \$6 for a program disk, and \$3 shipping (Canada \$30, \$8, and \$7).

David W. Martin (see address list, page 14).

The MSD Information Exchange provides public domain software, a newsletter, and other materials to readers who send self-addressed envelopes or disks with self-addressed mailers. Contact Paul E. Eckler for details.

MSD Information Exchange (see address list, page 14).

C-128 DESIGN PROGRAM

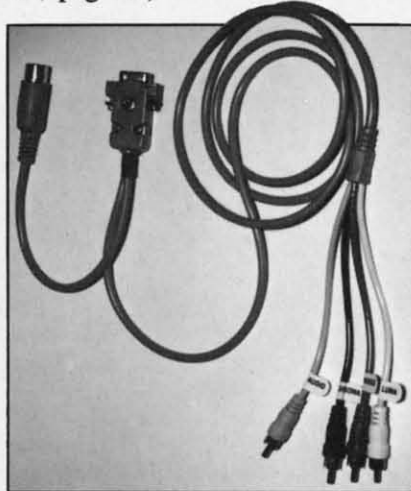
A drawing program designed for the C-128 incorporating the 1750 512K RAM option, *T.H.I.S.* (Technological Highbred Integrated System) includes 100% tracking in all graphic modes, four drawing screens, seven font styles, a 48K print buffer, and many other features. It can be had with light pen (\$159) or without (\$59).

Micro Aided Designs, 714-680-5179 (see address list, page 14).

INCA LINKER

Two cables made for the C-128 by INCA permit monochrome 80 column displays on any composite monitor with RCA jacks. The 80 Column Mono Cable for the Commodore 1701 and 1702 monitors has a switch for toggling between 40 and 80 columns. The 40/80 Column Switch Cable is for all other monitors with RCA jacks, also with a toggle. (Neither cable is intended for use with RGB monitors such as the Commodore 1902, or with any standard TV set.)

INCA, 619-224-1177 (see address list, page 14).



Cables for 80-column C-128 display.
READER SERVICE NO. 149

AMIGA DISK MANAGER

CLI-Mate (\$34.95) makes it possible to perform Amiga disk operations without using the CLI or *Workbench*. Users can rename and delete files, make directories, create multiple file copies, adjust page length, margins,

HOW DOES IT RATE?

Overall Rating	A
Ease of Use	A
Documentation	A
Reliability	A
Error Handling	A
Value for Money	A
<i>Commodore 64 disk COMAL Starters Kit rated by The Book of Commodore 64 Software</i>	

Performance	10
Ease of Use	9
Reliability	9
Documentation	8
<i>Commodore 64 disk COMAL rated by The Best Vic/C64 Software</i>	

Overall rating: *****
Commodore 64 COMAL cartridge rated by INFO magazine (5 stars is the highest possible rating)

Overall rating: *****
Commodore 64 COMAL disk rated by INFO magazine

COMAL is a well designed programming language available for the following computer systems:

C64 disk: \$29.95
C64/C128 cartridge: \$138.95
IBM PC & MS-DOS: \$395.00
CP/M: \$109.95
Apple Macintosh - late 1987
Apple IIe / IIc - late 1987

COMAL Users Group USA Ltd
6041 Monona Drive, Room 111
Madison, WI 53716
phone: (608) 222-4432

WE WON'T PAY YOUR TAXES!

But **TAX MASTER** will help you compute them more QUICKLY and EASILY. Be the Master of your Income Taxes with **TAX MASTER**, now available for your 1986 Federal Income Taxes for the C64/C128 with single, twin, or dual disk drive and optional printer.

- **FORMS** 1040, 4562, & Schedules A, B, C, D, E, and F.
- **PERFORMS** all arithmetic CORRECTLY.
- **EASY CHANGE** of any entry, with easy RECALCULATION of the entire form.
- **TRANSFERS** numbers between forms.
- **CALCULATES** your taxes and **REFUND**. Tax tables are included.
- **SAVES** all your data to disk for future changes.
- **PRINTS** the data from each form.
- **DISCOUNT** coupon toward the purchase of next year's updated program.

TAX MASTER (DISK ONLY) ONLY \$30.00

TIRED OF SWITCHING CABLES?

VIDEO MASTER 128 provides continuous 80 column color (RGBI), 80 column monochrome, and audio out. Switch between 80 column monochrome and 40 column color for composite monitor. Use up to 4 monitors at once! Includes composite cable.

VIDEO MASTER 128 for Commodore 128 \$39.95

FED UP WITH SYNTAX ERRORS?

HELP MASTER 64 provides Instant On-Line Help screens for all 69 BASIC commands when you need them. Takes no BASIC RAM. No interference with loading, saving, editing, or running BASIC programs. Includes 368 page reference manual, more.

HELP MASTER 64 \$24.95

OTHER MASTER SOFTWARE ITEMS

RESET MASTER reset switch with 2 serial ports \$24.95
CHIP SAVER KIT protects from static \$5.95
MODEM MASTER user port extender \$29.95, w/reset \$34.95
Y-NOT? 6-foot serial Y cable, 1 male, 2 female \$15.00
C128 80_col monochrome cable for non-RGB monitor \$ 9.00
Surge Protector 6 outlet power strip 6-foot cord \$21.00
Disk Notcher — lets you use both sides of disk \$ 8.00

Send for Free Catalog

MASTER SOFTWARE

6 Hillery Ct.
 Randallstown, MD 21133
 (301) 922-2962

All prices in US Dollars. Surface shipping in US & Canada is included. Foreign orders add \$5. Canadian orders use Canadian POSTAL money order. Maryland residents add 5% tax.



Reader Service No. 152

Can Your Computer Make YOU a MILLIONAIRE?

LOTTERY 64 • LOTTERY +4

It costs no more to buy a WINNING lottery ticket!

LOTTERY was designed to use the raw power of your computer to help you play the various lottery games: LOTTO, PICK 3, PICK 4, LUCKY LOTTERY, 6/49, SUPER LOTTO, etc. We do not believe there is a better system than the "original" LOTTERY 64 & LOTTERY +4.

Join the growing list of winners.

SPECIFY 64/128 or PLUS/4

To order send \$24.95 for each plus \$3.00 postage and handling per order to: (Illinois residents add 6% sales tax)



C.O.D. orders call: (312) 566-4647



Superior Micro Systems, Inc.
 P.O. Box 713 • Wheeling, IL 60090
 Dealer inquiries welcome!

Reader Service No. 154

14 AHoy!

and page numbers, and produce screen or printed output in HEX or ASCII format. A view utility permits the accessing, viewing, and copying of IFF formatted pictures.

Progressive Peripherals & Software, 303-825-4144 (see address list, page 14).

FREE SPIRIT'S FIFTH

The latest in the series, *Music of the Masters V* includes over 50 themes from popular classical works, such as Beethoven's Fifth, the Blue Danube, and March of the Toreadors. Price of the C-64 disk is \$9.95; or all five volumes can be purchased for \$38.95 (shipping free).

Free Spirit Software, 312-352-7323 (see address list, page 14).

DEEP END SOFTWARE

Swimming Pool Chemistry Database for the C-128 (\$19.95) calculates the required doses of pool chemicals

and maintains test and treatment records. The programs will conduct cost and consumption analysis, and record any maintenance action and its costs.

Free Spirit Software, Inc., 312-352-7323 (see address list, page 14).

PRINTER OUTPUT

Epson has reduced list prices on four of its dot matrix printers: the LQ-800 (to \$699 from \$799), the LQ-1000 (to \$995 from \$1095), the LX-86 (to \$299 from \$349), and the EX-800 (to \$649 from \$749).

Epson America, Inc., 213-539-9140 (see address list, page 14).

The Seikosha SP-1200AI (\$319) prints at 120 cps in draft and 25 cps in NLQ mode, at a noise level under 52 dBA. Features include removable tractor unit and automatic single sheet loading.

Seikosha America Inc., 201-529-4655 (see address list, page 14).

Continued on page 114

Companies Mentioned in Scuttlebutt

Access Software, Inc.
 2561 South 1560 West
 Woods Cross, UT 84087
 Phone: 801-298-9077

Activision, Inc.
 2350 Bayshore Parkway
 Mountain View, CA 94043
 Phone: 415-960-0410

Bethesda Softworks
 9208 Burning Tree Road
 Bethesda, MD 20817
 Phone: 301-469-7061

Chicago B-128 Users Group
 1723 Michigan
 Sturgeon Bay, WI 54235
 Phone: 414-743-4151

Commodore Business Machines, Inc.
 1200 Wilson Drive
 West Chester, PA 19380
 Phone: 215-431-9100

Electronic Arts
 1820 Gateway Drive
 San Mateo, CA 94404
 Phone: 415-571-7171

Epson America, Inc.
 2780 Lomita Boulevard

Torrance, CA 90505
 Phone: 213-539-9140

Free Spirit Software
 538 S. Edgewood
 LaGrange, IL 60525
 Phone: 312-352-7323

INCA
 1249 Downing Street
 P.O. Box 789
 Imperial Beach, CA 92032
 Phone: 619-224-1177

Infocom, Inc.
 125 CambridgePark Drive
 Cambridge, MA 02140
 Phone: 617-492-6000

MSD Information Exchange
 2705 Hulman Street
 Terre Haute, IN 47803

Micro Aided Designs
 1311 South Highland Drive
 Fullerton, CA 92632
 Phone: 714-680-5179

MicroProse
 120 Lakefront Drive
 Hunt Valley, MD 21030
 Phone: 301-771-1151

Mindscape Inc.
 3444 Dundee Road
 Northbrook, IL 60062
 Phone: 312-480-7667

Passport Designs Inc.
 625 Miramontes Street
 Half Moon Bay, CA 94019
 Phone: 415-726-0280

R.M. Harris
 P.O. Box 12303
 Fort Wayne, IN 46863

Seikosha America Inc.
 1111 Macarthur Boulevard
 Mahwah, NJ 07430
 Phone: 201-529-4655

Small Systems Software
 150 Chapman Drive
 Wellsburg, WV 26070
 Phone: 304-737-2891

Timeworks, Inc.
 444 Lake Cook Road
 Deerfield, IL 60015
 Phone: 312-948-9200

Trans Com, Inc.
 703-13 Annoreno Drive
 Addison, IL 60101
 Phone: 312-543-9055

PIEMAN

For the C-64

By Bob Blackmer

Needing to make a little extra cash, you are elated to hear about an opening at the *Ahoy! Pie Emporium* as a counterman. After an interview with the manager, he agrees to hire you. You listen attentively as he describes your duties, which consist of taking pies off the conveyor line and giving them to the waiting customers. You say to yourself, "This job is a piece of cake!" After serving several customers and brimming with confidence, you begin to sense that the piemaking machine is running a little fast. Not having the experience to service the machine, you do your best as some of the pies begin to hit the floor....

Pieman is a colorful arcade game for the C-64 written in machine language. The object of the game is to serve all the customers that show up at the *Ahoy! Pie Emporium*.

To take a pie, position yourself so you can see your hands above the conveyor line and when a pie goes by,

press the fire button of a joystick plugged in Port 2. You will now have a pie, which you take to the service counter. When you are in front of the customer, press the fire button and you will make a sale. After you have sold a number of pies, the conveyor will speed up. At this point, some pies will begin to land on the floor. When you have ruined 30 pies, the *Ahoy! Pie Emporium* will close to clean up and hire a new counterman. How many pies can you sell?

Pieman must be entered using *Flankspeed* (see page 87). After typing in and saving *Pieman*, reset the computer and LOAD "PIEMAN",8,1. Then SYS 49152 to start. □

SEE PROGRAM LISTING ON PAGE 94

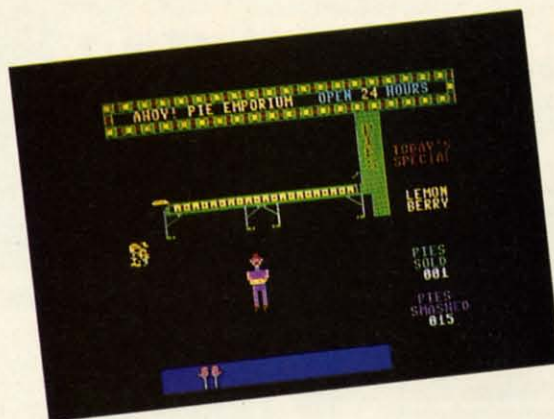


PHOTO: MICHAEL R. DAVILA

PANASONIC

1080i — \$199⁹⁵
1091i — \$259⁹⁵

MCS

DISKS

5 1/4 DS/DD . \$.40
3 1/2 DS/DD . \$1.50



BY COMMODORE
AMIGA 1000*
PLUS

**1080
Color Monitor**

90 DAYS
PARTS
& LABOR

\$850

C.P.U. IS
REFURBISHED

- Future Sound . . . \$139.95
- DIGI-VIEW . . . \$159.95
- 1080 Monitor . . . \$259.95
- Enhancer . . . \$14.95

**SIDECAR
GEN LOCK
CALL!**

- 256K RAM . . . \$79.95
- 1680 Modem . . . \$159.95
- Allegra (512K) . . . \$299.95
- Amega (1 Meg) . . . \$399.95



NEW LOW PRICES!

- 64C . . . \$169.95
- 1541C . . . \$179.95
- 1351 . . . \$39.95
- 1802C . . . CALL
- 128 . . . \$249.95
- 1571 . . . \$219.95
- 1670 . . . \$119.95
- 1902 . . . CALL

**CALL US
BEFORE YOU BUY!**

Over 2400 software titles in stock!

NEW! STAIR PRINTERS

**N PIO
\$159⁹⁵**



- NX10 . . . \$199.95
- NX10C . . . \$219.95
- NL10 . . . \$249.95
- NX15 . . . \$319.95

FULL LINE — CALL!

commodore
SFD 1001

1 MEG \$179⁹⁵

SEIKOSHA SP-1000VC

COMMODORE READY
\$164⁹⁵
NEAR LETTER QUALITY
FRICTION & TRACTOR
100 CPS
SHEET FEEDER



1200 BAUD
FROM \$88⁰⁰



2400 BAUD

commodore
Educator 64
\$199⁹⁵

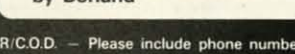


Commodore Compatible

commodore PC101
IBM Compatible

- 512K
- 360K Dual Sided Drive
- CGA Board
- One year warranty
- Parallel Port
- Serial Port
- GW BASIC
- DOS 3.2

FREE Sidekick by Borland \$699⁹⁵



ORDERS ONLY **800-433-7756**
HOURS: MON-FRI 10:00 a.m. - 8:00 p.m.
SAT 10:00 a.m. - 6:00 p.m. E.S.T.
Customer Service **313-427-0267**
Dealer Inquiries

JOYSTICKS FROM \$ 5.95
INTERFACES FROM \$ 29.95
OKI-MATE 20 \$184.95

MC/VISA/DISCOVER/C.O.D. — Please include phone number. Dealer inquiries invited, all prices discounted for cash or check. Call for shipping information. All returns are for repair/exchange only, call for auth. Prices and availability subject to change without notice. Offices are not open for walk-in traffic.

PROTECTO ENTERPRISES

"The Computer Experts"

22292 N. Pepper Rd., Barrington IL 60010

• OUR WARRANTY •

All our products carry a minimum 90 day warranty from the date of purchase. If problems arise, simply send your product to us via U.P.S. prepaid. We will IMMEDIATELY send you a replacement at no charge via U.P.S. prepaid. This proves once again that...

We Love Our Customers!

COMMODORE 64c

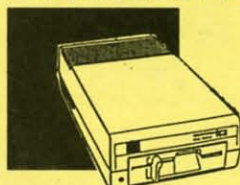


Includes the GEOS program.

SALE \$ 159.95

List \$299

BLUE CHIP DISK DRIVE



SALE \$ 159.95

List \$249

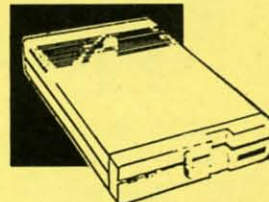
COMMODORE 128



SALE \$ 289.00

List \$399

1571 DISK DRIVE



SALE \$ 259.95

List \$349

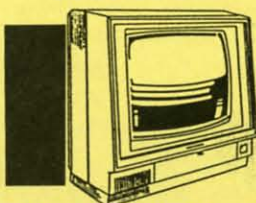
TV TUNER

Now switch your computer monitor into a television set with the flick of a switch. This Tuner has dual UHF/VHF selector switches, mute, automatic fine tuning and computer/TV selector switches. Hooks up between your computer and monitor! Inputs included for 300 ohm, 75 ohm, and UHF.

SALE \$ 49.95

List \$130

13" COLOR MONITOR

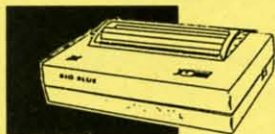


High Resolution, 1000 character display, with built in audio speaker with volume control.

SALE \$ 179.95

List \$329

BIG BLUE PRINTER



This is the affordable printer you've waited for! 8 1/2" letter size, 80 column dot matrix, heat transfer printer features upper and lower case, underline, graphics, word processing, and much more.

SALE \$ 39.95

List \$199

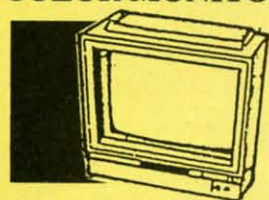
PRINTER & TYPEWRITER COMBINATION

Superb Silver Reed letter quality daisy wheel printer/typewriter, just a flick of the switch to interchange. Extra large carriage, typewriter keyboard, automatic margin control, compact, lightweight, drop in cassette ribbon! Includes Centronics Parallel Interface

SALE \$ 179.95

List \$299

14" RGB & COMPOSITE COLOR MONITOR

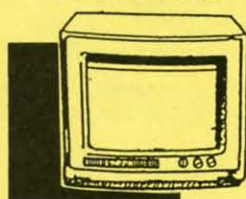


High Resolution, 80 column Monitor. Switch from RGB to Composite. (C128 - IBM - Apple) RGB cable \$19.95. Add \$14.50 shipping.

SALE \$ 237.00

List \$399

12" 80 COLUMN MONITOR

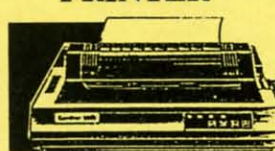


High Resolution amber or green screen monitor. 80 col. x 1000 lines at center. Non-glare screen. Works terrific with IBM, Apple and Laser business computers.

SALE \$ 99.00

List \$129

COMSTAR 1000 PRINTER



Print letters, documents, etc., at 100 cps. Works in Near Letter Quality mode. Features are dot addressable graphics, adjustable tractor and friction feed, margin settings, pica, elite, condensed, italics, super/subscript, underline, & more. CBM Interface Included.

SALE \$ 179.95

List \$349

160-180 CPS N.L.Q. 180 PRINTER

This printer has a Near Letter Quality button on the front panel. No more turning the printer on and off. The 8K buffer will free up your computer four times faster than conventional printers and the high speed will keep you computing more than printing. Super graphics along with Pica, Elite, Italics, and Condensed print. Lifetime Warranty on Print Head plus 6 month immediate replacement warranty.

SALE \$ 199.00

List \$499



TO ORDER CALL (312) 382-5244

8 am - 8 pm CST Weekdays / 9 am - 12 noon CST Saturdays



**BEST SERVICE IN THE USA • 1 DAY
EXPRESS MAIL • OVER 1000
PROGRAMS • VOLUME DISCOUNTS
• 15 DAY FREE TRIAL •
CUSTOMER LIST OF OVER
3,000,000 - LARGEST IN THE USA**

MUSICAL KEYBOARD

This sturdy 40 key professional guage spring loaded keyboard gives the feel and response of a real keyboard instrument. (Conductor software required)

SALE \$69.00

List \$159.95

COMPUTER CLEANERS

TV/Monitor Screen Restorer & Cleaning Kit, Disk Drive Cleaner, Anti-Static Keyboard Cleaner

*Choose any of these three computer cleaners for only \$9.95 each!

SALE \$9.95*

List \$19.95

1200 BAUD MODEM

Save time and money with this 1200 Baud modem. It has many features you expect a modem to have plus 4 times the speed!

SALE \$79.95

List \$199

SUPER AUTO DIAL MODEM



Features on-line clock, dialing from keyboard, capture and display high resolution characters, and much more.

SALE \$29.95

List \$99

SINGLE SIDED DOUBLE DENSITY DISKS

100% Certified 5 1/4" floppy disks. Lifetime Warranty. 1 Box of 100 \$29.00 List \$1.99 each

.29¢ ea.

SPECIAL BONUS COUPON

We pack a special software discount coupon with every Computer, Disk Drive, Printer, or Monitor we sell! This coupon allows you to **SAVE OVER \$250** off sale prices!

(EXAMPLES)

Name	List	Sale	Coupon
Transformers	\$34.95	\$22.95	\$21.95
Trio C128	\$69.95	\$42.95	\$39.95
Indoor Sports	\$29.95	\$19.95	\$18.95
Championship Basketball	\$34.95	\$22.95	\$21.95
Leader Board	\$39.95	\$23.95	\$21.95
Tales of Me	\$39.95	\$16.95	\$14.95
Monitor Stand	\$79.95	\$19.95	\$16.95
Marble Madness	\$24.95	\$22.95	\$19.95
Super Bowl Sunday	\$35.00	\$20.95	\$18.95
SAT Sample Test	\$39.95	\$14.95	\$12.95
Commando	\$34.95	\$22.95	\$21.95
Auto Duel	\$42.95	\$32.95	\$29.95
Flight Control Joystick	\$19.95	\$12.95	\$10.00
Robotics Workshop	\$149.00	\$119.95	\$114.95
C128 Troubleshooting & Repair Guide	\$19.00	\$14.95	\$12.95

(See over 100 coupon items in our catalog.)

FOR FREE CATALOG CALL

(312) 382-5244

**CALL BEFORE YOU ORDER: PRICES MAY BE
LOWER & WE OFFER SPECIAL SYSTEM DEALS**

COMMODORE SOFTWARE

ACCESS

ACTION PACK (D)	\$19.95
LEADER BOARD (D)	23.95
LEADER BOARD COURSES (D)	13.95
MACH 5 (C)	19.95
MACH 128 (C)	28.95
TENTH FRAME (D)	23.95

ACCOLADE

ACE OF ACES (D)	\$18.95
DAM BUSTERS (D)	18.95
FIGHT NIGHT (D)	18.95
HARDBALL (D)	18.95
LAW OF THE WEST (D)	18.95
KILLED UNTIL DEAD (D)	18.95

BLUE CHIP

BARON (D)	\$14.95
MILLIONAIRE (D)	14.95
TYCOON (D)	14.95

BCI

TOM WEISKOPF PRO GOLF (D)	\$11.95
VIDEO PHILE (D)	14.95
PRINTERS LIB. 1 (D)	8.95
PRINTERS LIB. 2 (D)	8.95
DATABASE MGR./PLUS - C128 (D)	14.95
MIND OVER MATTER (D)	8.95

BRODERBUND

PRINT SHOP (D)	\$25.95
GRAPHICS LIB. 1,2 or 3 (D)	15.95
COMPANION (D)	22.95
TOY SHOP (D)	38.95
WHERE IS CARMEN SANDIEGO (D)	21.95
GRAPHICS LIB. HOLIDAY ED. (D)	15.95

ELECTRONIC ARTS

HEART OF AFRICA (D)	\$9.95
ONE ON ONE (D)	9.95
PINBALL CONSTRUCTION (D)	9.95
MUSIC CONSTRUCTION (D)	9.95
RACING DESTRUCTION (D)	9.95
MARBLE MADNESS (D)	22.95
STAR FLEET 1 (D)	25.95
BALKON RAIDER (D)	22.95
QUIZAM (D)	22.95

DATA SOFT

221 B BAKER STREET (D)	\$17.95
MERCENARY (D)	17.95
NEVER ENDING STORY (D)	17.95
MIND PURSUIT (D)	17.95
VIDEO TITLE SHOP (D)	17.95
THEATRE EUROPE (D)	19.95

DESIGNWARE

BODY TRANSPARENT (D)	\$24.95
EUROPEAN NATIONS & LOCATIONS (D)	22.95
STATES AND TRAITS (D)	22.95

HAYDEN

SARGON II (D)	\$9.95
SAT VERBAL (D)	14.95
SAT MATH (D)	14.95
SAT PRACTICE TEST (D)	14.95

COSMI

SUPER HUEY II (D)	\$12.95
TALLADEGA (D)	10.95
BEYOND FORBIDDEN FOREST (D)	10.95

DATA EAST

COMMANDO (D)	\$22.95
KARATE CHAMP (D)	22.95
KUNG FU MASTER (D)	22.95

EPYX

CHAMPIONSHIP WRESTLING (D)	\$22.95
DESTROYER (D)	22.95
MOVIE MONSTER (D)	22.95
WINTER GAMES (D)	22.95
WORLD GAMES (D)	22.95
WORLD KARATE (D)	16.95
WORLD'S GREATEST FOOTBALL (D)	22.95

ARTWORK

BEACH BLANKET VOLLEYBALL (D)	\$9.95
EQUESTRIAN SHOWJUMPER (D)	9.95
HIGHLAND GAMES (D)	9.95
POLICE CADET (D)	9.95
THAI BOXING (D)	9.95
BRIDGE 4.0 (D)	16.95

HI-TECH EXPRESSIONS

CARD WARE (D)	\$6.95
HEART WARE (D)	9.95
PARTY WARE (D)	9.95
WARE WITH ALL KIT (D)	9.95
HOLIDAY PRINT PAPER (D)	7.95

SUB-LOGIC

FLIGHT SIMULATOR II (D)	\$31.95
JET (D)	25.95
FOOTBALL (D)	25.95
BASEBALL (D)	31.95

S.S.I.

ROADWAR 2000 (D)	\$23.95
BATTLE OF ANTIETAM (D)	31.95
GETTYSBURG (D)	32.95
WAR IN SOUTH PACIFIC (D)	32.95
NAM (D)	23.95
U.S.A.A.F. (D)	32.95
KAMPFGROUPE (D)	32.95
WAR SHIP (D)	32.95

SOFTSYNC

ACCOUNTANT, INC. C128 (D)	\$59.95
DESK MANAGER (D)	24.95
KID PRO QUO (D)	19.95
MODEL DIET (D)	19.95
TRIO C64 (D)	29.95

SPINNAKER

DELTA DRAWING (C)	\$9.95
NUMBER TUMBLERS (C)	9.95
SEA SPELLER (C)	9.95
UP & ADD'EM (C)	9.95

Add \$3.00 (\$10.00 for hardware) for shipping, handling, and insurance. Illinois residents please add 6 1/2 % sales tax. Add \$6.00 (\$20.00 for hardware) for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. All orders must be in U.S. Dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA. Enclose Cashier Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail. Prices & Availability subject to change without notice. Hardware shipping prices vary according to weight. Please call for amount. No APO-FPO for Monitors. C.O.D. on phone orders only.

VISA-MASTER CARD-C.O.D.

SALE •

Famous National Brand

• SAVE

NLQ 180

Hi-Speed Printer Sale

• 160 - 180 CPS • Near Letter Quality •

Lifetime Warranty*

**Below
Wholesale
Cost Prices!!!**

**Price
Break
Thru**

\$199⁰⁰

Sale

List \$499.95

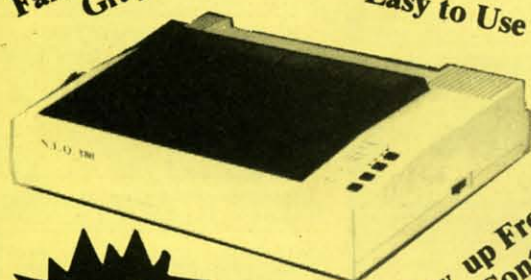
**Fantastic
Price**

60% OFF LIST PRICE

**Fantastic
Graphics**

10" Carriage

Easy to Use



NEW

**All New up Front
Panel Controls**

Lifetime Warranty*

NLQ-180 Premium Quality Printer

**Near Letter Quality Selectable From Front
Panel Controls • High Speed Dot Matrix •
Letter Quality Modes • 8K Buffer frees up
computer 4-times faster • Pica, Elite,
Italics, Condensed • Super Graphics •
Business or Personal • Tractor/Friction •
15 Day Free Trial • Lifetime Warranty on
Print Head* • 6 Month Immediate
Replacement Warranty •**

NLQ-180 Print Samples

*This is an example of ITALICS
Enhanced Boldface
Condensed Text Double-strike
example of Near Letter Quality*

APPLE — ATARI — EPSON —

NLQ180 SPECIFICATIONS

— IBM — COMMODORE — ETC. —

Print Buffer

8K bytes utility buffer

Printing Direction

Text Mode — Bi-directional

Graphic Mode — Uni-directional

Interface

Centronics type parallel (8-bit)

Paper

Plain paper, Roll paper, Single sheet

Fanfold, Multipart paper: max. 3 sheets
(original plus 2 copies)

Character Fonts

Pica, Elite, Italics, Condensed

Printing Method

Impact dot matrix

Printing Speed

160-180 CPS at standard character printing

Printing Characters

Standard 9 x 9 dot matrix

NLQ 12 x 18 dot matrix (33cps)

Character size: 2.12 x 2.8 mm (standard)

Character sets: Full ASCII character set (96)
32 International characters

Ink Ribbon Cartridge

Ribbon Life: 3 million characters/cartridge

Physical Dimensions

Size: 15" x 12" x 5"

Weight: 12.7 lbs.

Maximum Number of Characters

Standard:	10 cpi	80 cpl
Standard enlarged:	5 cpi	40 cpl
Elite:	12 cpi	96 cpl
Elite enlarged:	6 cpi	48 cpl
Condensed:	17 cpi	132 cpl
Condensed enlarged:	8.5 cpi	66 cpl
Condensed elite:	20 cpi	160 cpl

INTERFACES

Atari \$39.95

Apple \$49.95

Commodore \$29.95

IBM \$49.95

Laser \$19.95

Add \$10.00 for shipping, handling, and insurance. Illinois residents please add 6 1/4 % sales tax. Add 20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. All orders must be in U.S. Dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA. Enclose Cashier Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail. Prices & Availability subject to change without notice.

VISA — MASTER CARD — C.O.D.

C.O.D. on phone orders only.

Reader Service No. 105

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

• **Famous National Brand** •

15 Day Free Trial-Satisfaction or Your Money Back

90 Day Immediate Replacement Warranty

**Fantastic
Price**

BIG BLUE

**Super Print
Quality**

80 Column Printer • 8½" Letter Size

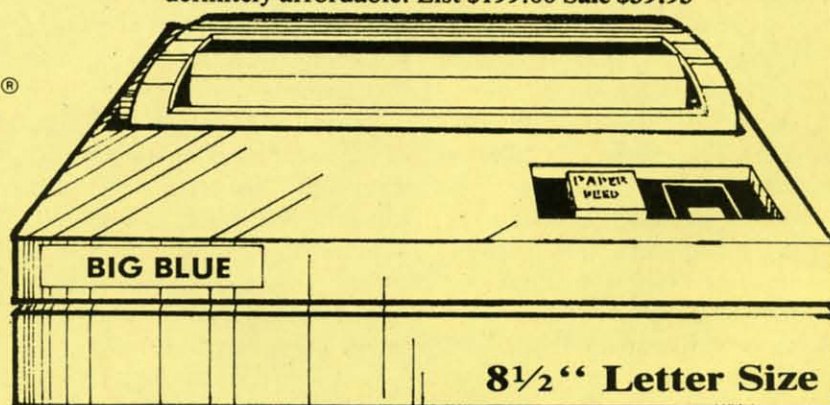
**We Like this Printer so much
We Bought Out the Factory**

SALE \$39⁹⁵ SALE

List \$199.00

Now you can have a full fledged 8½" letter size 80 column printer for less than the cost of a large box of paper. This printer uses advanced dot matrix, heat transfer technology to print upper and lower case (with true lower descenders), underline, enlarged, all points addressable graphics plus More. Print out pictures, program listings, wordprocessing pages, graphics and more. Perfect for the homeowner or student and definitely affordable. List \$199.00 Sale \$39.95

Commodore®
IBM®



Atari®
Apple®

This printer was made by **Canon®** for the IBM PC and PCjr. The Big Blue printer comes ready to hook up to the serial port of the IBM® PC jr. Plus with low cost adapter cables you can connect the Big Blue printer to the **Apple® II, IIe, IIc, Apple Compatibles, Atari®, Commodore® 64, 128, SX-64, Vic 20, Plus 4, IBM® PC, IBM® XT, IBM® AT, IBM Compatibles, TI-99, Tandy 1000, plus many more.**

Intelligent Commodore® Interface—Connects Big Blue to the printer port of the C-64 and 128. Print graphics, us Printshop, word processors and more List \$49.95 **Sale \$19.95**
Intelligent Atari® Interface—Connects the Big Blue to Atari® computers (except 1200). Print Atari graphics, Printshop, word processors, and more List \$49.95 **Sale \$19.95**
RS-232 Adapter—Adapts Big Blue for IBM® PC, AT, XT, PCjr. & Apple® II series RS-232 port List \$19.95 **Sale \$ 9.95**
Laser128, Apple II®c Interface ... List \$24.95 **Sale \$12.95** **Printer Stand** List \$24.95 **Sale \$14.95**
Paper (2 Rolls)..... List \$19.95 **Sale \$ 5.95** **Single Sheet Paper (Qty 500)** List \$29.95 **Sale \$12.95**

IBM, Apple, Canon, Commodore, Atari are trademarks of International Business Machines, Apple Computer, Canon Inc, Commodore Business Machines, Atari Inc. Respectively.

Add \$7.50 for shipping, handling and insurance. Illinois residents please add 6½% tax. Add \$15.00 for CANADA, PUERTO RICO, HAWAII, ALASKA and APO-FPO orders. All orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA. Enclose Cashier Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Prices & Availability subject to change without notice.
VISA — MASTER CARD — C.O.D. C.O.D. on phone orders only

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

Reader Service No. 105

Fractals are paradoxical in nature. Fractals are the most complicated geometrical structures imaginable. On the other hand, they may be created by repeatedly applying very simple rules.

The mathematical concepts involving fractals have been studied since the early 1900's. It is only recently with the advent of high-powered computers and graphics displays that these geometric marvels have become front-page news.

This month we will look at one type of fractal construction, recursively generated curves. We will develop a program for the C-128 to show various stages of fractal creation. The techniques will be applicable to other computers, but they must provide a line-drawing routine to implement the program.

BEAUTY IN REPETITION

To create a fractal curve, start with a line segment called the "initiator." To this initiator apply some rule called the "generator." The generator will generally break the initiator into smaller segments of various orientations. The next step of fractal generation is to apply the generator rule to each of the small segments created by the first application. This process is repeated as desired (or until computer memory or graphics resolution are exceeded).

The initiator and the first two applications of a generator are shown in Figure 1. The initiator for our purposes is a horizontal line segment starting at the point (0,0). We are using standard cartesian-coordinate notation. The first number of the pair is the X or horizontal position. The second number is the Y or vertical position.

The generator in this example subdivides the initiator horizontally into thirds, so we will think of the initiator as extending from (0,0) to (3,0). This generator consists of four segments as shown in Figure 1B. The segments go from point (0,0) to (1,0), from (1,0) to (2,1), from (2,1) to (2,0), and from (2,0) to (3,0).

In words, this generator on a horizontal initiator may be described as "right one unit, up and right one unit, down one unit, right one unit." "Right" means in the positive x direction, and "up" means in the positive y direction. The generator always starts at (0,0), the left-hand point of the initiator, and it must eventually end up at the right-hand point of the initiator.

The generator in Figure 1B is the Level 1 fractal curve. To create the Level 2 curve, apply the generator rules to each of the four segments in the Level 1 curve. Simply divide each of the segments in Figure 1B into thirds and construct a miniature of the Level 1 curve on each segment. The results are shown in Figure 1C.

The terms "right" and "up" are not exactly appropriate for a segment which is not horizontal from left to right. However, for such segments, just rotate the segment until it is horizontal, then apply the generator rules, and finally rotate it back.

BRING ON THE SOFTWARE

Level 1 and Level 2 curves can readily be drawn by hand. Beyond the Level 2 curve, the use of pencil and paper becomes tedious and error-prone indeed. To the rescue comes the personal computer with its wonderful graphics capabilities. The program *Fractal Maker* on page 110 provides a general-purpose fractal generating tool.

The program is written for the C-128. To implement it on the C-64 would require the addition of a high resolution line-drawing statement. A DRAW or LINE statement is available in some of the advanced BASICs for the C-64. (For the really ambitious, the September '84 and August '85 *Rupert Reports* present line drawing and high resolution plotting routines which could be adapted for this purpose.)

This program displays a menu from which any one of nine fractal generators may be chosen. The descriptions of the generators are stored in DATA statements beginning at line 10000. The main loop of the program is contained in lines 100 through 800. It consists of six primary functions. We will discuss each one.

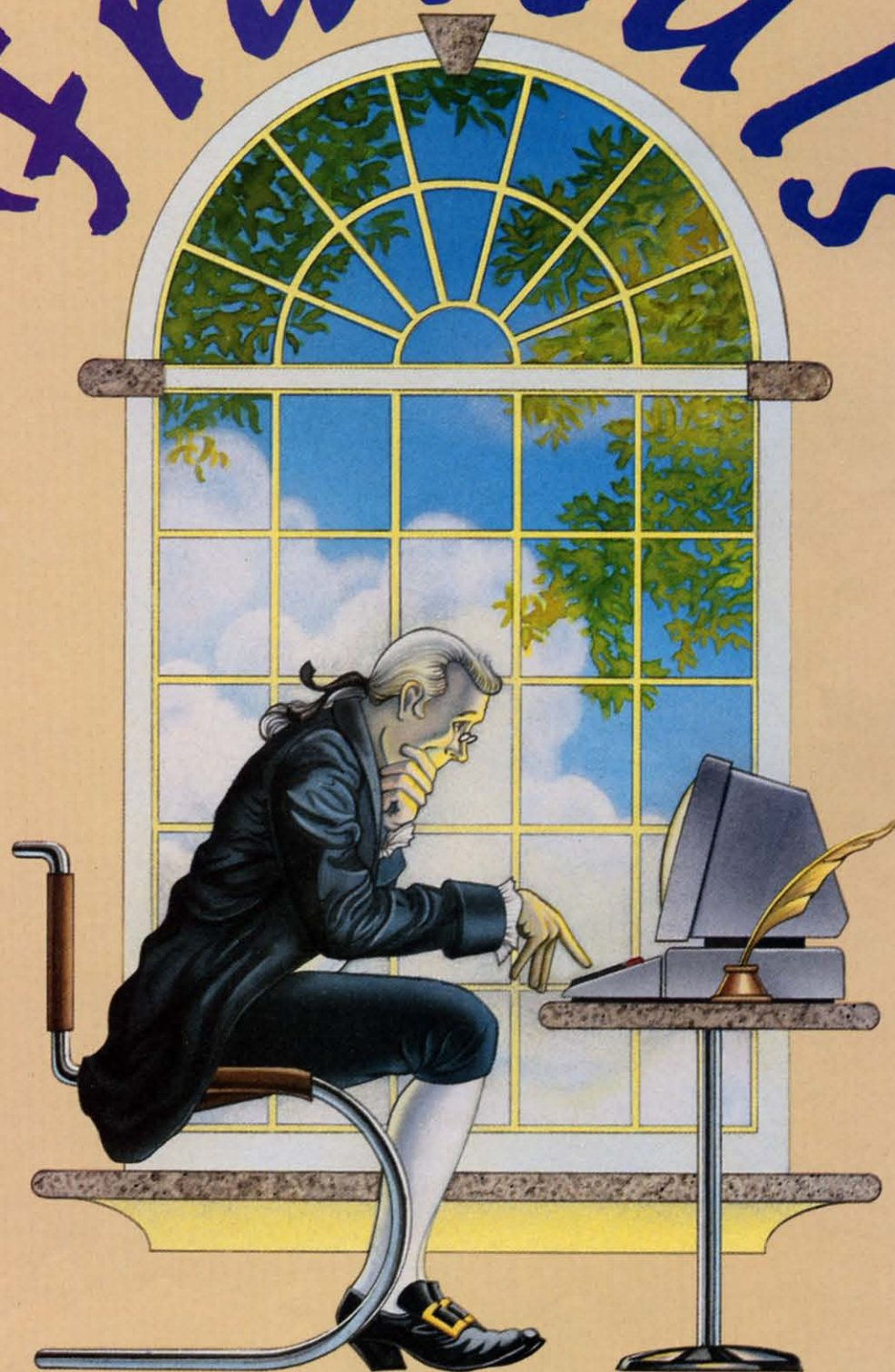
The menu routine starts at line 9000. As written, it allows only nine choices. The number of choices is contained in NUMSEL in line 9110. To expand the menu to more choices would require additional logic or else the use of the INPUT statement instead of the GETKEY statement in line 9140. With GETKEY, the RETURN key is not pressed to make a selection.

Line 9170 does the heavy work in this routine. It calculates a line number DL corresponding to a DATA statement belonging to the selected fractal generator. The RESTORE DL statement sets the READ-DATA pointer to the selected line. Consequently, the line numbers beginning at 10000 must not be changed. The data section for fractal number one starts at line 10100. Fractal numbers two and three start at 10200 and 10300, and so forth. We will discuss the data structure shortly.

The second routine in the main loop is the initialization beginning at line 2000. This routine reads the first two data values N and R pointed to by the menu routine. These are the numbers of segments in the generator (N) and of horizontal subdivisions (R) of the initiator.

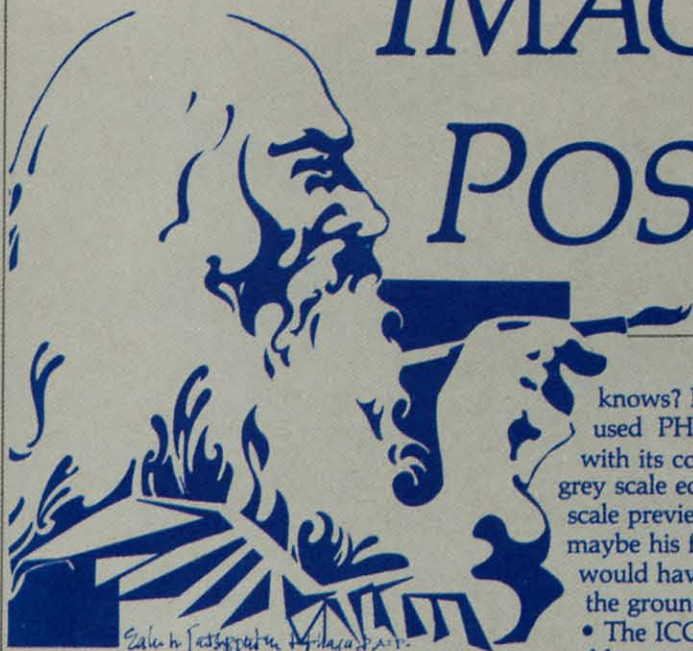
For our example in Figure 1 above, N would be 4 and R would be 3. The initialization routine dimensions the necessary arrays depending upon the total number of seg-

Fractals



❧ *Geometric Intricacies* ❧
By Dale Rupert

IMAGINE THE POSSIBILITIES



knows? If Da Vinci had used PHOTO FINISH with its color editor, grey scale editor and grey scale preview mode, maybe his flying machine would have gotten off the ground.

• The ICON FACTORY

would not only have allowed Da Vinci to change his illustrations from picture to graphic and vice versa, he also could have cropped, flipped, enlarged, inverted and overlaid. And with the ICON FACTORY's brand-new reduce function he could have reduced his illustrations while maintaining their clarity and definition.

Now you can have the advantages that Leonardo Da Vinci didn't have. Solutions Unlimited's

programs are available to help you turn your inventive ideas into outstanding graphic statements.

GRAFIX-LINK is available separately for \$19.95, or it is included free with the following programs:

BILLBOARD MAKER \$39.95

PHOTO FINISH \$29.95

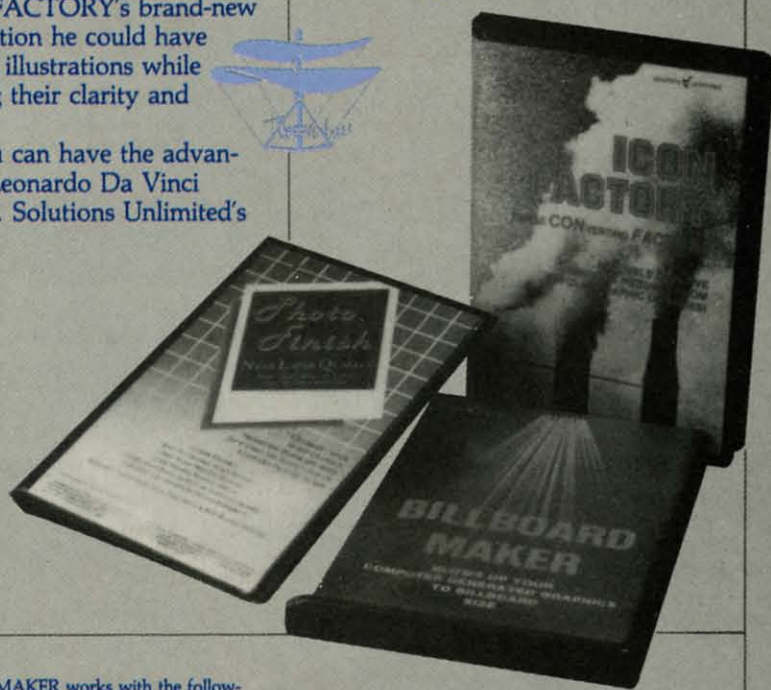
ICON FACTORY \$39.95

Ask your retailer or call (914) 693-7455 or write Solutions Unlimited, P.O. Box 177, Dobbs Ferry, NY 10522. Visa or Master Card accepted.

Imagine if Leonardo Da Vinci could have used GRAFIX-LINK, the new program from Solutions Unlimited that allows file conversion between GEOS and popular hi-res formats. The possibilities are endless...

• Using the BILLBOARD MAKER Da Vinci could have made thousands of Mona Lisas smile at people throughout Italy. He could have enlarged her portrait to sign (4x) or mural (16x) size and the Optimizer function would have automatically smoothed out all the jagged edges of the computer picture. With added frames and text, all the world would have known why Mona Lisa was smiling.

• PHOTO FINISH would have allowed Da Vinci to make clean, smooth, Near Laser Quality illustrations of his ideas. Who



GRAFIX-LINK works with the following HI-RES FORMATS from the following programs: PRINT SHOP (screen magic), PRINT SHOP (graphics a/b side) ©Broderbund Software, PRINT MASTER graphics ©Unison World, DOODLE ©Omni, FLEXI-DRAW ©Inkwell, GEOS ©Berkeley Software, COMPUTEREYES ©Digital Vision, NEWSROOM photos ©Springboard Software, BILLBOARD MAKER, ICON FACTORY and PHOTO FINISH ©Solutions Unlimited.

BILLBOARD MAKER works with the following PICTURE FORMATS from the following programs:

PRINT SHOP (screen magic), DOODLE, FLEXI-DRAW, COMPUTEREYES, KOALA ©Koala Technologies Corp., ANIMATION STATION ©Suncom, BLAZING PADDLES ©Baudville, SUPERSKETCH ©Personal Peripheral, ICON FACTORY, and GRAFIX-LINK.

ICON FACTORY AND PHOTO FINISH work with the following PICTURE AND GRAPHIC LIBRARY FORMATS from the following programs:

PRINT SHOP (screen magic and graphics), DOODLE, FLEXI-DRAW, COMPUTEREYES, KOALA, ANIMATION STATION, BLAZING PADDLES, SUPERSKETCH, PRINTMASTER graphics, NEWSROOM photos and GRAFIX-LINK.

All of the above require the Commodore 64/128 computer, 1541/1571 Disk Drive and Dot Matrix Printer for hard copy.

ments which will be drawn at the highest level. The amount of memory and the number of segments in the generator determine the maximum number of levels which can be displayed.

WINDOW DRESSING

The third main-loop routine sets up a split-screen, high resolution graphics mode with two lines of text at the bottom of the screen. This routine also initializes the graphics window constants so that images of various sizes can be scaled to fill the screen. (The details of this routine are presented in the September '86 *Rupert Report: Windows, Viewports, and a Moebius Strip.*)

The coordinates of the graphics window are read in line 3060. Each fractal has a window size given for it. The four numbers are WL, WR, WB, and WT corresponding to the left, right, bottom, and top coordinates of the window through which the fractal image is viewed.

Some explanation is in order. For the fractal in Figure 1, the left-most point has a horizontal (X) value of 0 and the right-most point has an X value of 3. To make the curve go completely across the screen, we would set WL and WR to 0 and 3 respectively. The vertical size of the fractal can be estimated by looking at the Level 2 curve in Figure 1C. The lowest vertical (Y) value is 0, and the curve doesn't extend above a Y value of 1. So we could specify 0 and 1 for WB and WT respectively.

These numbers are not critical. If we chose -0.5 and 1.5 for WB and WT, the fractal would not fill the screen vertically. There would be some blank screen above and below the image. These window values mean that the screen will show all points with vertical values ranging from -0.5 up to 1.5. There is a blank border since our image extends only from 0 up to 1 vertically. These numbers can be chosen to change the X to Y aspect ratio of the screen so that a one-by-one object is really square on the screen.

If the range of the window values is too small, the image will be crunched wherever it hits the window border. It is better to choose a window which is too large rather than too small. The whole image can be seen (although perhaps shrunken) in a large window, although it will be distorted at the edges by a small window.

To aid in creating your own fractals, the program keeps track of the minimum and maximum X and Y values actually plotted in the image. Those values are presented to you after the last level fractal has been displayed. You may use those numbers in the DATA statements for WL, WR, WB, and WT if you want the highest level fractal to completely fill the screen.

Generally it is best to set WB slightly below the lowest Y value of the fractal, since the two lines of text at the bottom of the split screen cover up part of the graphics image.

THE GENERATOR

The routine at line 4000 reads the remaining data for the selected fractal. These values are the X,Y pairs for

the coordinates of each of the midpoints in the generator. Note that there must be N-1 pairs of values where N is the number of line segments in the generator (specified in the first DATA statement). The generator data pairs do not include the starting point 0,0. Also the data values do not include the ending point. The ending point will always be R,0 where R is the number of horizontal subdivisions specified in the first DATA statement.

For the example in Figure 1, there would be three pairs of data values: (1,0), (2,1), and (2,0). The left and right endpoints (0,0) and (3,0) must not be listed. Consequently the DATA statements for Figure 1 would be:

```
10100 REM - FIGURE 1 EXAMPLE
```

```
10120 DATA 4,3
```

```
10140 DATA 0,3,0,1
```

```
10160 DATA 1,0, 2,1, 2,0
```

To display this fractal, we must replace one of the nine sets of data. Here we have arbitrarily replaced the first set. (Before entering this new data, you might manually renumber lines 10100 - 10160 to 20100 - 20160 for example. That way you won't need to retype the data if you want the original fractal back.)

As a brief summary of the data structure, line 10120 gives the number of segments (N) and the horizontal width (R) of the generator. Line 10140 gives the left, right, bottom, and top values for the screen window (WL, WR,

LEROY'S CHEATSHEET

Keyboard Overlays



\$7.95
each
PLASTIC LAMINATED

For your **COMMODORE 128**



\$3.95
each

For your **COMMODORE 64**

Put Your Computer's Commands Where They Belong - And Your Manuals On The Shelf.

Have you ever sat at your computer with the manual in your lap trying to find an elusive command? How much time have you lost searching through manuals to refresh your memory on how to do what you wanted? Now you have a way to end that frustration - Leroy's Cheatsheets.

Leroy's Cheatsheets help you get into your program right away. We put the commands right at your fingertips, actual keystrokes are in **bold type**, variables are shown in *italics*. Designed by software experts, our durable plastic laminated overlays are comprehensive reference aids which document a product or system completely. Now use your software more easily and more effectively. With Leroy's Cheatsheets you'll never have to hunt for a program command again!!!

LEROY'S HELPBOK FOR ELITE

By David Palmer - The first person in the U.S. to attain ELITE status. Filled with hints & tips to sharpen your combat and trading skills. Covers approaching space station, goods to trade on what planets, quickest way to become ELITE and prepares you for FIREBIRD'S ELITE TOURNAMENT.

\$7.95
each
Plus Shipping

THE PROBLEM SOLVER EQUIPMENT STAND

only
\$19.95

Made of sturdy vinyl coated steel - strong enough for any computer equipment. This equipment stand will help you organize your system. With this unique open construction, cables are never in the wrong place, switches are more accessible and your equipment stays cooler. The Problem Solver Equipment stand was specially designed for Commodore computers 128 & 64. Keeps your monitor at eye level (Great for printers too).

COMMODORE 128 \$7.95 ea

Please send me the following LEROY'S CHEATSHEETS for the COMMODORE 128 for only \$7.95 each plus shipping.

<input type="checkbox"/> Basic 7.0	<input type="checkbox"/> Multiplan 128
<input type="checkbox"/> Blank (not laminated)	<input type="checkbox"/> Newsroom
<input type="checkbox"/> Data Manager 128	<input type="checkbox"/> Paperback Planner
<input type="checkbox"/> Disk 1571	<input type="checkbox"/> Paperback Writer
<input type="checkbox"/> Easy Script	<input type="checkbox"/> Paperclip II
<input type="checkbox"/> Elite	<input type="checkbox"/> Superbase 128
<input type="checkbox"/> Flight Simulator 2 & 3	<input type="checkbox"/> Superbase 128
<input type="checkbox"/> Flight Simulator 2	<input type="checkbox"/> SuperCalc 128
<input type="checkbox"/> For The Beginner	<input type="checkbox"/> Word Writer 128

FREE - Keyboard extender (each order)

COMMODORE 64 \$3.95 ea

Please send me the following LEROY'S CHEATSHEETS for the COMMODORE 64 for only \$3.95 each plus shipping.

<input type="checkbox"/> Basic 2.0	<input type="checkbox"/> Flight Simulator 2	<input type="checkbox"/> Paperback Planner
<input type="checkbox"/> Blank (not laminated)	<input type="checkbox"/> For The Beginner	<input type="checkbox"/> Paperback Writer
<input type="checkbox"/> Data Manager	<input type="checkbox"/> GEOS	<input type="checkbox"/> PaperClip
<input type="checkbox"/> Data Manager 2	<input type="checkbox"/> Multiplan	<input type="checkbox"/> Speedscript
<input type="checkbox"/> Disk 1541	<input type="checkbox"/> Newsroom	<input type="checkbox"/> Superbase 64
<input type="checkbox"/> Easy Script	<input type="checkbox"/> Paperback Planner	<input type="checkbox"/> Superscript 64
<input type="checkbox"/> Elite	<input type="checkbox"/> Word Writer	<input type="checkbox"/> SwiftCalc

Also fits the COMMODORE 64C

ORDERING INFORMATION: For fast delivery send cashier's check or money order. Personal and company checks allow 2 weeks to clear. Master Card and Visa orders please include card #, expiration date, prices and availability subject to change without notice.

SHIPPING: ☐ TOTAL ☐ CONT. U.S. ☐ APO FPO AK ☐ INTER. ☐ INTERNATIONAL

TAXES: Add 6% sales (include shipping) for PA residents only.

Name _____ Address _____ City _____ State _____ Zip _____

AHQY4

CHEATSHEET PRODUCTS, INC. P.O. Box 111388 Pittsburgh, PA. 15238

For Orders only TOLL FREE 1-800-334-2896 PA Orders - (412) 781-1551 DEALER INQUIRES WELCOME

Reader Service No. 127

WB, WT) dependent upon the size of the fractal. Line 10160 lists the $N-1$ pairs of midpoints of the generator in order, not including the two endpoints.

The generator routine assigns the endpoint values in lines 4020 and 4030. It reads the midpoint values and scales them to the horizontal range of 0 to 1 in lines 4050 to 4080. The loop in lines 4090 through 4140 calculates the horizontal and vertical distances (deltas) between consecutive points and stores them in the DX and DY arrays.

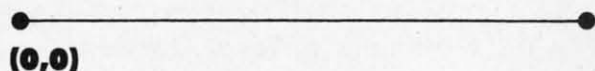


Figure 1A—Initiator

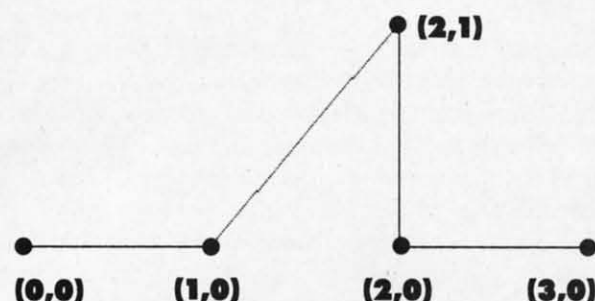


Figure 1B—Generator (Level 1)

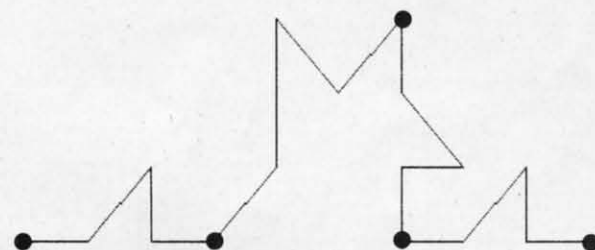


Figure 1C—Level 2 Fractal

READY TO DRAW

After all this preparation, the routine beginning at line 5000 is ready to begin calculating, storing, and drawing each level of the specified curve. The X and Y arrays store the coordinates of each point drawn.

The amount of available memory determines the number of levels which can be drawn. The REMarks should help figure out the operation of this part of the program. We will use our example from Figure 1 to provide a cursory description of the program flow sequence.

Assume the maximum number of levels (ML) to be plotted is three. (This is just an example; it is not the actual number which would be calculated in line 2020.) The number of segments (N) in the generator is 4. Line

2030 calculates the number of points in the final (level 3) curve to be 64, not including the initial point (0,0). The arrays X and Y have been dimensioned to contain elements from 0 to 64 apiece.

The left endpoint is in $X(0)$, $Y(0)$. The right endpoint is in $X(64)$, $Y(64)$. The three midpoints of the generator are evenly spaced throughout the array. The first midpoint is stored in element 16 ($X(16)$ and $Y(16)$). The other midpoints are in elements 32 and 48. These values are calculated and stored as the Level 1 curve is drawn.

The next level of the routine takes each consecutive pair of those Level 1 points, subdivides the segments between them, and calculates the three new midpoints for each of those segments. There will be 16 segments in Level 2.

These new points fit into the X and Y arrays between the points already there. For example, the three midpoints of the first segment are stored in elements 4, 8, and 12. Now the first segment is defined by elements 0 through 16 in steps of 4 of the X and Y arrays.

The third and final level subdivides each of the 16 segments into 4 more subsegments, giving a total of 64 segments. Since this is the highest level to be drawn, these new segment midpoints are stored in adjacent array locations, and the array is full.

For each segment at any given level, there are $N-1$ new subsegments to be determined. The loop at line 5120 steps through each segment from the previous level, and the loop at line 5220 calculates the $N-1$ new subsegment endpoints for each of those segments.

The program pauses at the end of each level. Press any key to proceed to the next level. Once the last level is displayed, a key press returns to the text screen where the actual displayed minimum and maximum values are listed. You may record these and modify the window coordinates in the DATA statements if the image is not properly filling the screen.

If you press any key during the calculation of a level, the computer asks whether you want to continue with that level or return to the menu. It may take a moment for the program to recognize your keystroke, since, for execution speed, the keyboard is checked only after each segment is complete.

The technical details of the program are quite involved. The operation of the program is quite straightforward. If you understand the structure of the DATA statements, you may easily create your own fractal generators. Reading about the program is nowhere near as enjoyable as running it.

PROGRAM INTRICACIES

Here are a few technical aspects of the *Fractal Maker* program. Line 9 was a last minute addition to make up for a BASIC 7.0 bug. The first time the program was run after booting, it would stop with a "SYNTAX ERROR IN 5020" error. Upon running it again, everything worked fine. It turns out that if the DEF FN in line 50 occurs before the high-resolution graphics screen is established

S & S

S & S Wholesalers, Inc.

**WHOLESALE TO THE PUBLIC
BUY BELOW DEALER COST!**

1-800-233-6345

ORDERS ONLY

226 Lincoln Road Miami Beach, FL 33139

DISKETTES

Sony DSDD 5 1/4"	\$ 9.97
Memorex DSDD 5 1/4"	\$ 8.97
Precision DSDD 5 1/4"	\$ 7.97
Bonus by Verbatim DSDD 5 1/4"	\$ 6.97
Sony 3 1/2" DSDD	\$ 25.50
Sony 3 1/2" SSDD	\$ 19.50
Winners 3 1/2" DSDD	\$ 24.00

SOFTWARE CLOSEOUTS

Zork I	\$ 4.77
Zork II	\$ 4.77
Zork III	\$ 4.77
File Now	\$ 7.77
Calc Now	\$ 7.77
Frogger	\$ 7.77
Q Bert	\$ 7.77
Popeye	\$ 7.77
Multiplan	\$ 29.77
Triad	\$ 4.77
Battlezone	\$ 7.77
Robotron	\$ 7.77
Rack-Em Up	\$ 6.77

ACCESS

Mach 5	\$ 22.50
Mach 128	\$ 29.90
Leader Board	\$ 23.90
Tournament Disk	\$ 12.90

MICROPROSE

Acrojet	\$ 20.77
F15 Strike Eagle	\$ 19.47
Conflict in Vietnam	\$ 19.47
Gunship	\$ 22.77
Silent Service	\$ 24.77

SPRINGBOARD

Certificate Maker	\$ 29.90
Newsroom	\$ 29.00
Clip Art I	\$ 18.90
Clip Art II	\$ 22.00

PRINTERS

Okimate 10	\$124.77
Okimate 20	\$134.77
Plug-N-Print C64	\$ 59.77
Plug-N-Print Amiga	\$ 69.77
Panasonic 1091	\$224.77
Panasonic 1080	\$199.77
Star NX 10	\$239.77
Star SG10C	\$228.77
Okimate 120	\$224.77
Epson LX 80	\$239.90
Epson FX 85	\$369.90
Epson FX 286	\$479.90

COMMODORE CLOSEOUTS

VIC 1525 Graphics Printer	\$ 99.90
MPS 803 Printer	\$109.90
C1600 300 Baud Modem	\$ 37.90
Commodore Plus/4	\$ 79.90

TIMEWORKS

Sylvia Porter's Personal Finance	\$ 39.90
Data Manager 128	\$ 37.77
Swiftcalc 128 w/Sideways	\$ 37.77
Wordwriter 128 w/Spell Check	\$ 37.77
Partner 128	\$ 37.77
All Four	\$149.90
Data Manager	\$ 27.77
Wordwriter	\$ 27.77
SwiftCalc	\$ 27.77
All Three	\$139.77

DIGITAL SOLUTIONS

Pocket Writer 64	\$ 23.77
Pocket Writer 128	\$ 28.77
Pocket Planner 64	\$ 23.77
Pocket Planner 128	\$ 28.77
Pocket Filer 64	\$ 23.77
Pocket Filer 12	\$ 28.77

AMIGA

**Call for Pricing
...IN STOCK...**

MONITORS

Samsung 14" Color	\$139.90
Samsung Green 12"	\$ 49.90
80 Col. Cable	\$ 8.77
Monitor Cable	\$ 5.77
NEC 12" Color	\$134.90

JOYSTICKS & ACCESSORIES

WICO The Boss	\$ 10.77
WICO Ball	\$ 14.77
WKO 3 Way	\$ 18.77
Kraft	\$ 6.77
5 1/4" Drive Cleaner	\$ 6.77
3 1/2" Drive Cleaner	\$ 7.77
CRT Cleaner	\$ 14.77
C64 Cover	\$ 6.77
C128 Cover	\$ 7.77
Drive Cover ST	\$ 7.77
Printer Head Cleaner	\$ 7.77

CLOSEOUT

Koala Pad	
By Koala Technologies	\$ 39.77

EPYX

Championship Wrestling	\$ 23.90
Word Games	\$ 23.90
Supper Cycle	\$ 23.77
Summer Games	\$ 23.90
Summer Games II	\$ 23.90
Winter Games	\$ 23.90
Fast Load	\$ 23.90
Multiplan	\$ 39.90
World Karate Champ	\$ 17.90
Worlds Greatest Baseball	\$ 22.90
Koronis Rift	\$ 22.90
Eidolon	\$ 22.90

SUBLOGIC

Jet	\$ 25.70
Flight Simulator II	\$ 31.70
Scenery Disks 1-6	\$ 13.70 EA
Scenery Disk 7-12	\$ 13.70 EA
Scenery Disks 6 Pack	\$ 69.70

BATTERIES INCLUDED

Consultant	\$ 35.77
Paperclip	\$ 35.97
Paperclip w/Spell	\$ 47.77

COMMODORE HARDWARE

C128 Computer	\$259.90
C1571 Disk Drive	\$239.90
MPS 1200 Printer	\$249.90
C1902 Monitor	\$288.00
C1350 Mouse	\$ 37.90
C1660 300 Baud Modem	\$ 49.90
C1670 1200 Baud Modem	\$148.90
C64 Computer	\$139.90
64C Computer	\$ CALL

ABACUS

Assembler Monitor	\$ 24.99
Basic 128	\$ 39.99
Basic 64	\$ 24.99
Cadpak 128	\$ 39.99
Cadpak 64	\$ 27.99
Chartpak 128	\$ 27.99
Chartpak 64	\$ 24.99
Cobol	\$ 27.00
Forth	\$ 26.90
Powerplan	\$ 26.90
Quick Copy 2.0	\$ 14.90
Super C Compiler	\$ 39.90
Super Pascal	\$ 39.90
T.A.S.	\$ 39.90
Video Basic	\$ 27.90
XPER	\$ 39.90

MASTERTRONIC

Last V8	\$ 6.49
5 A Side	\$ 6.49
Sluggo	\$ 6.49
Paul McCartney	\$ 6.49
BMX Racer	\$ 6.49
Sky Jet	\$ 6.49
Line Action Biker	\$ 6.49
Skiwriter	\$ 11.99
Busicalc 3	\$ 11.99
Instant Recall	\$ 11.99
• All 3	\$ 29.97

ACCOLADE

Ace of Aces	\$ 18.90
Dam Busters	\$ 17.90
Fight Night	\$ 17.90
Hardball	\$ 17.90
Law of the West	\$ 17.90

BRODERBUND

Karateka	\$ 17.00
Printshop	\$ 25.90
LIB 1/2/3	\$ 14.90
Companion	\$ 24.90
Bank St. Writer	\$ 32.90

PRECISION

Superbase 64	\$ 47.77
Superscript 64	\$ 47.77
Superbase 128	\$ 52.77
Superscript 128	\$ 52.77

CUSTOMER SERVICE OR IN FLORIDA (305) 538-1364

FREE FREIGHT ON ALL ORDERS WITHIN CONTINENTAL U.S. OVER \$100.00

Orders under \$100.00 add \$4.00 shipping and handling. C.O.D. orders add \$4.00.

Prices reflect a 3% cash discount. A.P.O., F.P.O. orders add 6% shipping & handling. Postal orders shipped surface. Add 6% for air shipment. Add 3% for VISA/MC. Florida residents add 5% sales tax. Personal checks allow 2 weeks for processing. Prices Subject to Change Without Notice.

ORDERS RECEIVED BEFORE 12:00 PM WILL BE SHIPPED SAME DAY.

ORDERS ONLY
1-800-233-6345

in line 3010, the first application of the defined function causes the syntax error. The solution is simply to define the graphics screen (set aside the memory block) before defining the function.

To see this error, delete line 9. Type GRAPHIC CLR to deallocate graphics memory space, then type RUN. After you choose a menu item, the program halts with the syntax error. Replace line 9, or just run the program again, and everything is fine.

Line 10 represents another very interesting aspect of BASIC 7.0. Line 10 branches to a block of statements which simply defines all of the scalar (non-dimensioned) variables. The program runs *much* more slowly for the initialization and first level if the scalar variables are not all defined before the arrays are dimensioned. Evidently if any new scalar variables are defined after the arrays are dimensioned, the arrays are "moved around" in memory. With 6000-element arrays, this moving around takes an appreciable amount of time.

For example, when NP is 4096, (X and Y arrays are dimensioned to 4096 each in line 2050), the time in jiffies for the main routines at lines 2000, 3000, and 4000 are as follows:

Routine at line . . .	With Line 10	Without Line 10
2000	44 jiffies	42 jiffies
3000	29 jiffies	2058 jiffies
4000	54 jiffies	306 jiffies

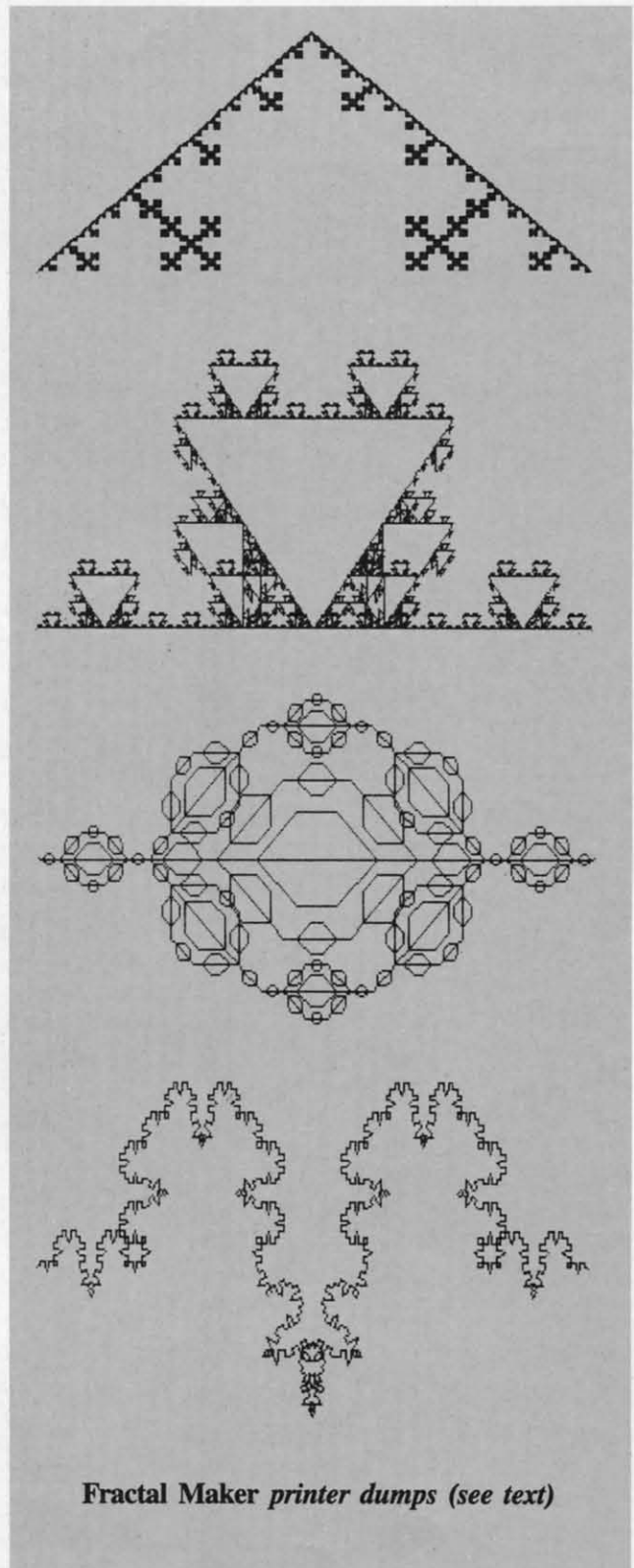
The routine at 2000 did not vary much since the arrays were not dimensioned until the end of that routine. (It is not clear why it took longer with line 10 in place.) The whopping difference of over 30 seconds for the routine at line 3000 is certainly proof of the significance of this rule:

For programs using large arrays, define all non-dimensioned variables *before* dimensioning the arrays.

The order in which variables are defined can also affect program execution speed. Define the most frequently used variables first. First in the list at line 8010 are the variables contained within the inner loop between lines 5230 and 5350, since this is the most-utilized code segment.

There are other ways you could improve the speed of this program. By combining several statements into one line and by removing the REMs at the ends of lines, you may find a measurable improvement. (Leave the REMs at the beginnings of lines since they are referenced by other parts of the program.) Only the statements in the main loop starting at line 5000 as well as the subroutines called by that loop will significantly affect execution times. Don't bother compressing the other portions.

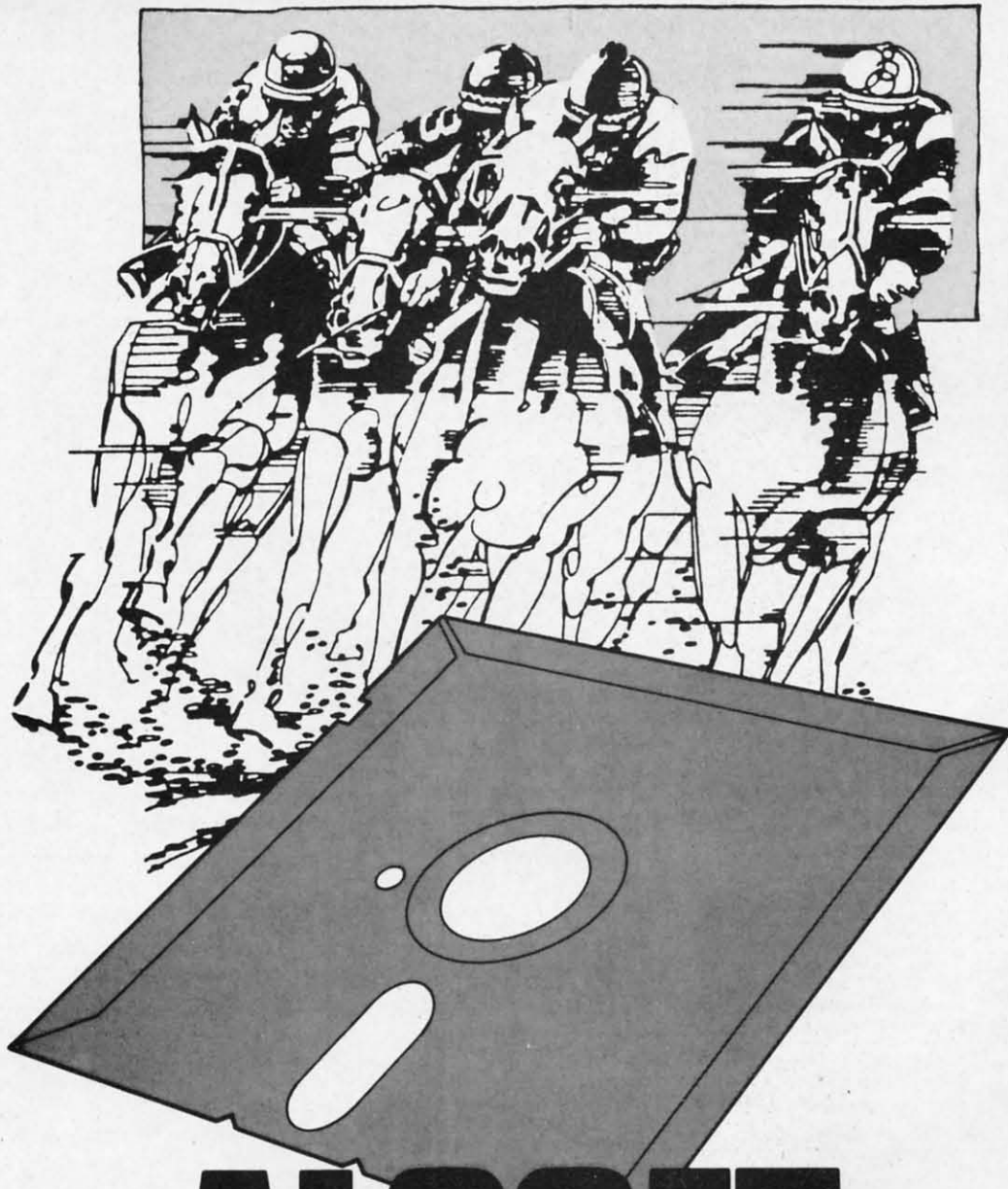
Once you know the minimum and maximum values for the displayed points of your fractals, you could de-



Fractal Maker printer dumps (see text)

lete the section of code which keeps track of those values. Simply delete the GOSUB 7100 statement in line 5310 as well as the statement in line 600.

Another way to really speed up the program is to run in the FAST mode. Unfortunately you won't see the image being drawn (that is at least half the fun), but at the end of each level, the program could return to SLOW mode to show the results.



ALSOFT

RACE ANALYSIS SYSTEMS

Program works only on a Commodore 64™ and 128.™

3-PACK (Harness, Thoro, & Greyhound)	\$69.95
2-PACK (Choose two from above)	\$59.95
1-PACK (Choose one from above)	\$39.95

30 DAY MONEY BACK GUARANTEE

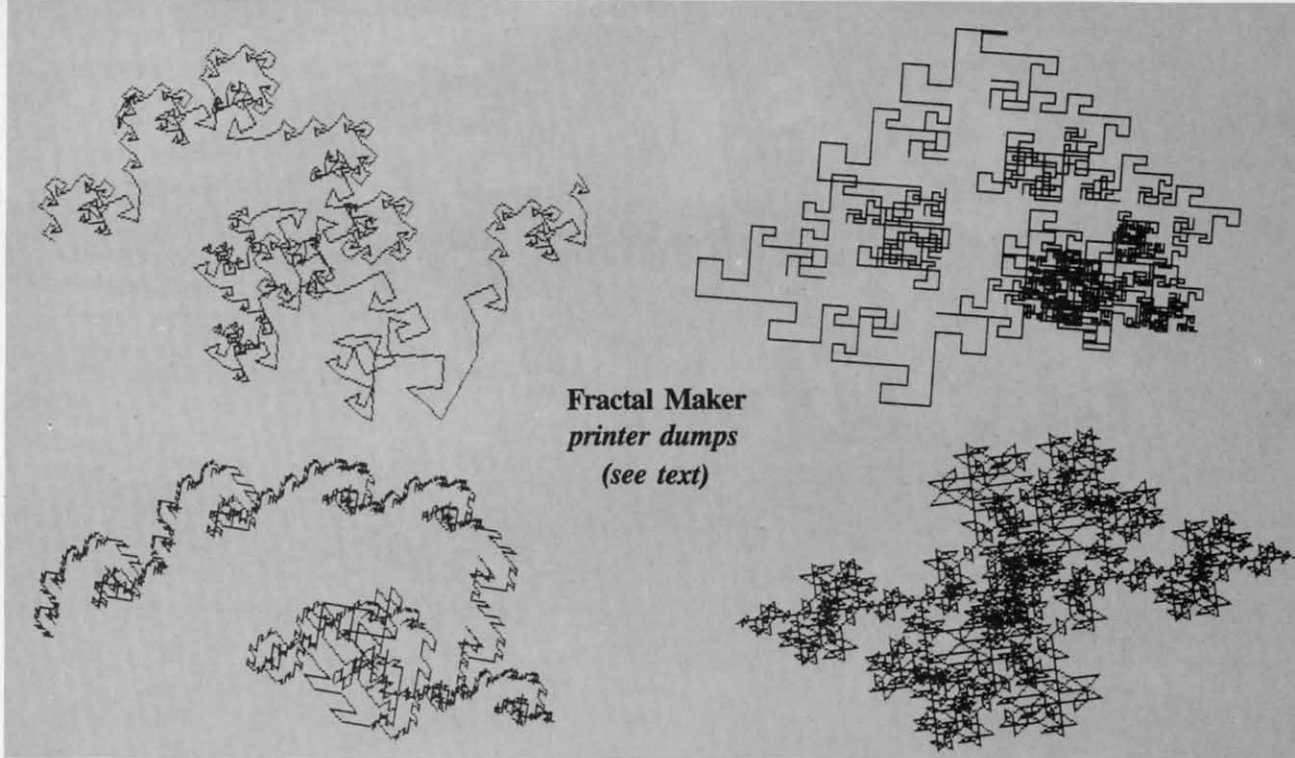
To Order: Ask your local retailer or call (412) 233-4659 for MasterCard & Visa orders. To order by mail, send check or money order to ALSOFT, 305 Large Avenue, Clairton, PA 15025. Prices listed include shipping and handling. All orders are shipped within 24 hours of receipt.

Reader Service No. 102

Professional Harness, Thoroughbred and Greyhound Race Analyzers with unparalleled features:

- Five minutes of typing replaces two hours of tedious hand calculations needed per race for these unique handicapping systems.
- Morning Line odds are not considered. This enables the program to generate unbiased ratings for each race entrant, and also increases the probability of Race Analysis accurately predicting "long-shot" winners.
- After all races have been handicapped (20 races max), Race Analysis will list (to screen, printer or disk) complete ratings for all entrants. In addition, the program will suggest "Best Bets", including: three best win bets, three best quinellas, best perfecta (exacta) and trifecta, and three best trifecta boxes.

All Alsoft Race Analysis Systems include the MASTER ANALYSIS DEVELOPMENT PACKAGE. With the assistance of this powerful program, handicappers are able to easily build, develop, and fine tune computerized handicapping systems for all types of sporting events. A Pro Football handicapping module is included on the program disk.



Fractal Maker
printer dumps
(see text)

The routines at lines 11000, 12000, and 13000 are not accessible from the main program. You may use them to save the screen image to a disk file, to load the image from a disk file, or to print the image on an Epson-compatible dot matrix printer.

Once the image has been drawn, return to the menu

and press Q to quit. The image still remains in the graphics memory. Type GOTO 11000 and give a filename to save the image. To load an image from disk, in direct mode type GOTO 12000 and give the filename. To see the image, type GRAPHIC 1.

The third routine will not be useful unless you have an Epson-compatible graphics printer. You may want to substitute your own screen dump routine for this one if you have a different printer. To print the graphics screen, type GOTO 13000. You may type FAST:GOTO 13000 to speed up the process. Then type SLOW when the printing is finished.

Other Resources

1. Dewdney, A.K. "Computer Recreations," *Scientific American*, Aug. 1985.
2. Mandelbrot, Benoit. *The Fractal Geometry of Nature*. New York, NY: W.H. Freeman and Company, 1983.
3. Sorenson, Peter R. "Fractals," *Byte*, Sept. 1984.

A distinguishing characteristic of fractals is their self-similarity at any level of magnification. Each portion has characteristics of the whole image. Other characteristics of fractals are discussed in the definitive volume on the subject, *The Fractal Geometry of Nature* by Benoit Mandelbrot (see below). It shows many other types of fractals besides the recursive curves we are discussing here. The terms in this article and the basic procedure for generating fractals are derived from the discussions in Mandelbrot's book.









For further reading on fractals and other fractal programs, try the other two articles listed below. *Fractal Maker* should provide many evenings (or months of evenings) of creative exploration. It may open up a whole new world for you. Let me know of your discoveries. □

SEE PROGRAM LISTING ON PAGE 110

COMPUTER REPAIR

800-221-7770

* AMIGA \$100.00 *

	Commodore Disk Drive 1541	\$60.00		Commodore Monitor 1701 1702	\$60.00
	Commodore SX-64 Portable Computer	\$99.00		PET 64 VIC 20 64 2031	\$45.00
	Commodore Printer MPS 801 MPS 803	\$50.00		Commodore Printer 1526 MPS 802	\$60.00
	MSD SD1, SD2 CBM 128 CBM 1571	\$85.00		Commodore Computer 8032 8050	\$85.00

AUTHORIZED
commodore
SERVICE CENTER

We Buy Computer Equipment

ALIVE	
64	65.00
1541	75.00
8050	150.00
SX64	150.00
MSD SD2	100.00

DEAD	
64	35.00
1541	50.00
8050	100.00
SX64	100.00
MSD SD2	75.00

Power sup. 64, 27.95

**PARTS
FOR
SALE**

Please add 5.00
for shipping

Commodore Parts For Sale

82S100	18.95
8502	2.95
8504	4.95
8520	4.95
8522	4.95
8526	14.95
8567	19.95
8581	19.95
8510	12.95
4164	99 ea.
7701/8701	9.95
8560	14.95
8721	24.95
8722	24.95

Complete parts for all
CBM Equip. CALL

T.C. ELECTRONICS
HWY 36 PO 1129
HARTSELLE, AL. 35640 800-221-7770

Expand your vocabulary— Take on a new language

Features of *Super Pascal*:

- full implementation of Jensen & Wirth Pascal
- C-64 high-speed DOS (3X faster)
- includes many language extensions for systems programming
- integrated assembler for machine code requirements
- built-in editor with renumber, find, auto, change, append, delete
- includes fast graphic library
- large 48K workspace
- works with one or two drives
- advanced error handling
- C-128 version supports 80-column hires graphics
- with 220-page manual

Super Pascal

Your complete system for developing applications in Pascal. *Super Pascal* is a complete implementation of standard Pascal (Jensen and Wirth). C-64 version has a high-speed DOS (3X) that makes using it quick and efficient. The extensive editor (source included) contains added features: append files, search and replace. Includes an inline assembler for optionally coding in machine language. *Super Pascal* is so capable that it's used in hundreds of schools to teach Pascal. But it can be used for more than just learning Pascal, use it for serious programming. The graphic library (source included) is written in machine language for fast execution. Want to learn Pascal or develop software using the best tool available? *Super Pascal* is your first choice.

for the C-64 \$59.95
for the C-128 \$59.95

Super
Pascal
Language
Compiler



Features of *Super C*:

- compiles into fast machine code
- built-in editor with search, replace, block commands, more
- supports strings and arrays
- handles object code up to 53K
- supports recursive programming techniques
- Libraries included:
 - standard I/O library
 - 25+ command graphic library
 - math library with trig functions
- C-128 version supports RAM disk and 40/80 column modes
- works with one or more drives
- with 275-page manual

Super C

C is one of today's most popular languages. It's easy to transport C source code from one computer to another. With *Super C* you can develop software or just learn C on your Commodore. *Super C* takes full advantage of this versatile language. Produces 6502 machine code and is many times faster than BASIC. Includes a full-screen editor (search, replace and block operations), compiler, linker and handbook. You to combine up to seven modules with the linker. Besides the standard I/O library, a graphic library (plot points, draw lines, fill in areas) and a math library (sin, cos, tan, log, arctan, more) are included. Whether you just want to learn C, or program in a serious C environment for your Commodore, *Super C* is the one to buy.

for the C-64 \$59.95
for the C-128 \$59.95

Super
C
Language
Compiler



Abacus 

P.O. Box 7219 • Dept. H4 • Grand Rapids, MI 49507 • Telex 709-101 • Phone 616/241-5510
Call **now** for the name of the dealer nearest you. Or order directly using your MC, Visa or Amex card. Add \$4.00 per order for shipping. Foreign orders add \$12.00 per item. Call (616) 241-5510 or write for your **free** catalog. 30-day money back software guarantee. Dealers inquires welcome—over 2000 dealers nationwide.

Have your Commodore® look as smart as it works.



Consolidate your 64, 64C and 128 system with the Command Center.

With the
Command Center,
your system is
compact and
complete.



Without the Command Center your Commodore peripherals look cluttered and take up most of your desk top.

Get your workspace back again.

The Command Center will untangle your wires, unclutter your desk and put peripherals at your fingertips. Condensing your whole system into one compact unit, you might consider it the **ultimate** Commodore peripheral. You get Commodore value with the look of a more expensive system.

Just look at all it includes:

- **Built-in AC Power Strip** with power surge and voltage spike protection, line noise filtering and power outlets.
- **Built-in Drive/CPU Cooling Fan** to prevent overheating.
- **Modular Telephone Plug**, with its own on-line/off-line telecommunications switch. (Option on 64 and 64C).
- **Master AC Switch** for easy system power-up.
- **Single or Dual Drive Configurations** with the standard drive insert.



Many built-in conveniences add to the Command Center's value.

*Commodore is a registered trademark of Commodore Electronics Ltd.

KETEK

Free 30-day trial offer
and one-year warranty.

For faster service, call
1-800-626-4582 toll-free
1-319-338-7123 (Iowa Residents)

KETEK P.O. Box 203
Oakdale, IA 52319

YES! Rush me a Command Center to complete my system. I may enjoy it for up to 30 days and return it for a full refund.

- ☐ 64\$119.95
☐ 64C\$129.95
☐ 128\$149.95

(Please include \$3.50 for shipping and handling.)

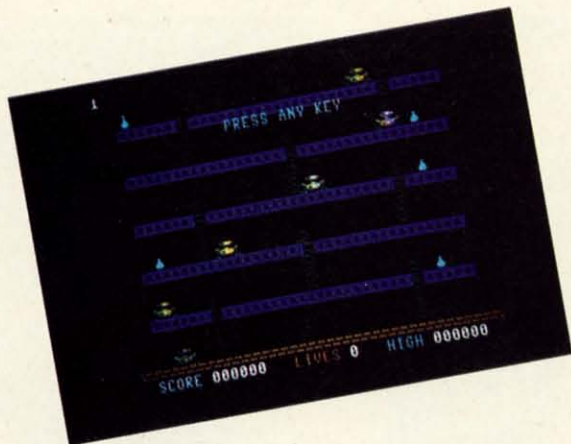
Name _____
Address _____
City _____ State _____ Zip _____
Phone Number _____

DEALER INQUIRIES INVITED
Reader Service No. 114

SCRAMBLER

For the C-64

By Tony Brantner



Scrambler requires split-second timing as you run, jump, and climb from the ground floor to the top, dodging armed robot sentries and collecting bags of gold along the way.

Using *Flankspeed* (see page 87), type in and save a copy of *Scrambler*. Type SYS 49152 and press RETURN to start. The Scrambler enters from the lower left side of the screen. Using a joystick plugged into Port 2, push it to the left or right to move him in the corresponding direction. When you come to a ladder, push the joystick up or down to climb to a different floor.

Each floor is occupied by a roving robot sentry capable of firing deadly lasers. It's safer to climb the ladders to escape them, but you can press the fire button to jump over a guard or laser when necessary.

On each of the upper floors is a bag of gold. To collect one, simply touch it. Each bag is worth 50 points multiplied by the current level, which is shown in the upper left corner of the screen.

You begin each game with three lives. Once you climb up the top ladder, you earn an extra life and move on to the next level. A maximum of nine lives can be held in reserve. You'll need them, since each succeeding level features faster robots and lasers to contend with. There are twelve levels in all. Any time you need a break, press the SHIFT-LOCK key. □

SEE PROGRAM LISTING ON PAGE 91



PHOTO: MICHAEL R. DAVILA

EXPAND YOUR COMMODORE TO PERFORM LIKE NEVER BEFORE

Just plug in the Final Cartridge.
only \$44.95

Does NOT use existing memory

The first completely external operating system created specifically for the Commodore 64, 64C, and 128.

Upgrades hardware and software

Takes the place of at least 6 separate devices, 1) Disk Turbo—5 times faster loading and saving; 2) Preprogrammed Function Keys—eliminate long, tedious command sequences for many commands; 3) Extended Machine Language Monitor—with relocated load-scrolling up and down, bankswitching, and more; 4) Printer Interface—prints all Commodore graphics plus screen-dump utility; 5) Basic Tool Kit—Auto Line Numbering, Delete large program blocks with one touch, Old recovers accidentally-deleted programs, Renumbering, Find, Help debugs system, Disk Append adds new programs to existing files; 6) Make backup copies of any software program.



Other Convenient features

Freezer—16 sub menus • color changes • 4 resets • centronics/serial screendumps • print vector setting • reverse printing • stops and continues almost every program • allows total backup to disk or tape automatically • creates one file on disk or tape • freezes 4 to 6 times faster than dedicated freezers • game killer
Screendump Capability—Prints low-res, high-res and multicolor • prints full page • prints from games and more
Keyboard Extras—Delete parts of lines • move cursor
operates your printer as a typewriter

BONUS! Additional 24K extra RAM for basic programs

10 Day Money-back Guarantee, Full year warranty

SPECIAL!

Commodore II Centronics printer cable—\$19.95

Payments to:

H & P Computers

- Bank or Certified Check, Personal Check, Money Order, Visa or MasterCard and C.O.D.
- Add \$5.00 for shipping and handling
- NJ and NY residents add appropriate sales tax
- Dealer inquiries welcome

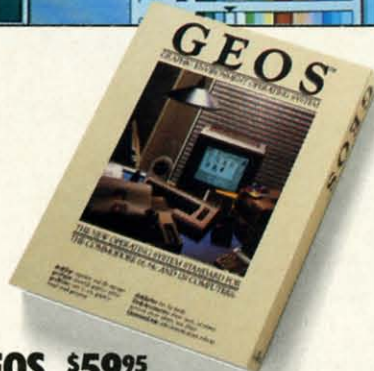
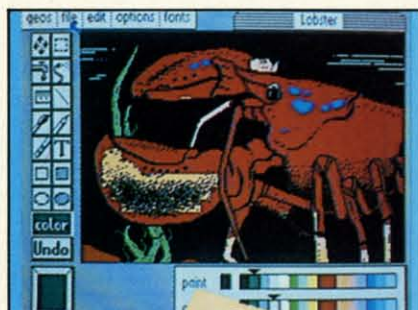


H & P THE FINAL CARTRIDGE®
HOME PERSONAL
COMPUTERS OF AMERICA

154 Valley Street, South Orange, New Jersey 07079 (201) 763-3946

Reader Service No. 140

IF YOU STILL THINK COM PLAY AROUND V

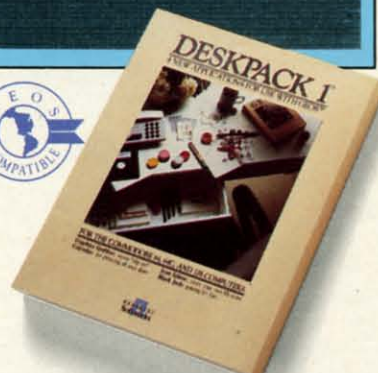


GEOS \$59⁹⁵

The Graphic Environment Operating System that opens up a whole universe of new possibilities for Commodores. With geoWrite, geoPaint, fast-loading diskTurbo and support for all GEOS-compatible applications.

FONTPACK 1 \$29⁹⁹

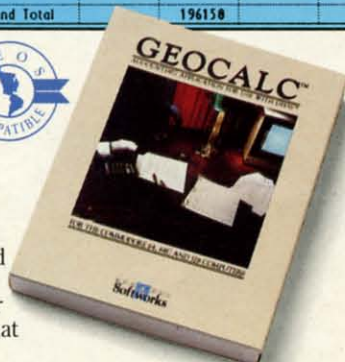
A collection of 20 more fonts for use with GEOS applications, in various shapes and sizes for more expressive and creative documents.



DESKPACK 1 \$34⁹⁵

Four GEOS-compatible applications: Graphics Grabber for importing art from Print Shop,™ Newsroom™ and Print Master™ graphics; Calendar; Icon Editor and Black Jack Dealer.

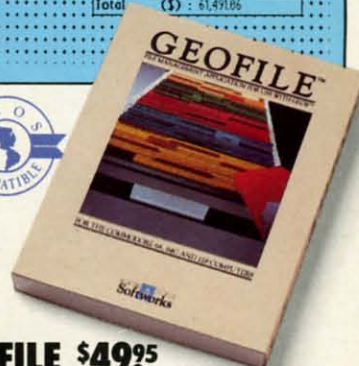
Operating Expenses				
	A	B	C	D
4 Operating Expense				
5		January	February	March
6 Raw Materials	11000	11750	10750	
7 Manufacturing	15000	14500	14350	
8 Rent	4000	4000	4000	
9 Labor	20000	20000	21000	
10 Utilities	3000	3150	3100	
11 Transportation	8000	7800	8000	
12 Overseas Shipping	4000	4500	4250	
13				
14 Total	65000	65700	65450	
15				
16 Grand Total			196150	



GEOCALC \$49⁹⁵

The GEOS-compatible, number-crunching spreadsheet for tracking and analyzing numerical data. Create your own formulas, perform calculations for anything from simple geometry to "what if" cost projections.

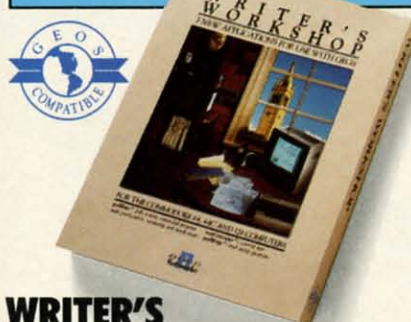
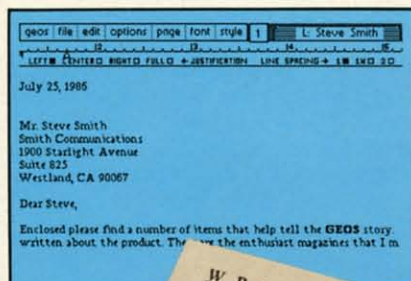
Invoice	
Customer Name : Seagull Dev. Co.	Date : 09/28/85
P.O. Number : 6974	Invoice # : 0976-025
Address : 67 Ocean Blvd. Seal-lead, CA	Cust. # : 190075-2
Job Description : Building Restoration	
Remit total to:	Materials (\$) : 10,762.43
Seal-lead Construction	Labor (\$) : 47,240.00
Terms:	Tax (6%) (\$) : 3,460.63
net 30 days	Total (\$) : 61,491.06



GEOFILE \$49⁹⁵

The GEOS-compatible database manager that sorts, edits and prioritizes whatever data you feed it. You fill out the "input form," specify your command, and geoFile takes it from there.

COMMODORES ARE TOYS, NOT WITH THESE.

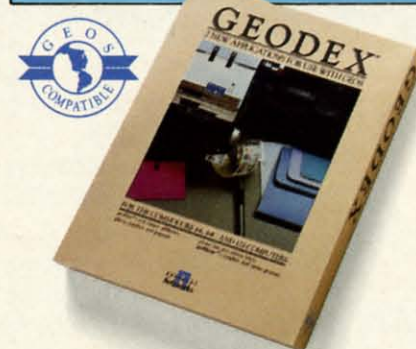
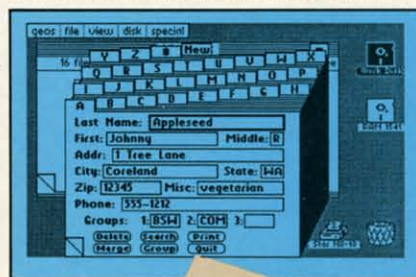


WRITER'S WORKSHOP \$49⁹⁵

All the GEOS-compatible tools a writer needs, including geoWrite 2.0 with headers, footers and features to justify, center, search and replace text. Includes a Text Grabber (for converting text from programs like Paper Clip™), geoMerge and LaserWriter printing capability.

GEODEX \$39⁹⁵

The GEOS-compatible directory that allows you to create lists by name, address, phone number, etc. Includes geoMerge to customize form letters and invitations.



GEOPRINT CABLE \$39⁹⁵

The six-foot cable that speeds up printing because it's parallel—not serial. Connects easily to Commodores with fewer wires and no interface box.



To order call 1-800-443-0100 ext. 234
(California residents add 7% sales tax.)

\$2.50 US/\$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoWrite, geoPaint, geoCalc, geoLex, geoMerge, geoFile, Desktop 1, Fontpack 1, Writer's Workshop and Berkeley Softworks are trademarks of Berkeley Softworks. Print Shop, Newsroom, Print Master, and Paper Clip are trademarks of companies other than Berkeley Softworks.

Sooner or later, you're going to discover that there's more to Commodores than fun and games.

You're going to discover power.

Not the kind of power that blasts aliens out of the galaxy. But the kind that whips through boatloads of data in seconds. The kind that crunches numbers and drafts documents like child's play.

The kind you find in GEOS.

Every GEOS application can take your Commodore from "mastering the universe" to a university master's degree, with all kinds of advanced capabilities that function at hyper-speeds you never imagined possible.

So if you're tired of toying with technology, try playing around with GEOS. Once you feel its power, you'll know that for anyone who still thinks Commodores are toys, the game's over.



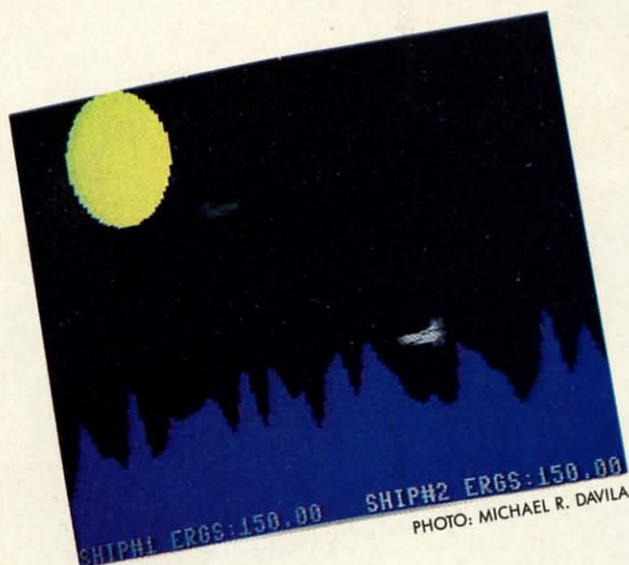
The brightest minds are working at Berkeley.

Reader Service No. 112

PLANET DUEL

For the C-128

By Cleveland M. Blakemore



The energy gauge is sputtering on empty after a massive hit under your fuselage by a nuke. Your right engine is smoking. Your shields are out. You know if you sustain any more damage, you and your ship will be toast floating over the rocky terrain below.

You're betting if you can just make it to the Mycho Braha Valley, you'll be able to lure the enemy ship into the trench under the natural bridge there, pull out, and hit him from above with a counterstrike. It's one chance in a million, but what do you have to lose?

If only you'd spent a little more money on your armor shielding...

Where is that alien scum, anyway? Hey! He's right behind you! He's firing his torpedoes! Aaaaahhh...boom!!!

The game is *Planet Duel*, a two-player game for the C-128 in BASIC 7.0.

This is a two-player combat game, played on the hires screen over a colorful asteroid plain.

You will design your own combat fighter by choosing from three different menus to select armament, shielding, and engines.

Each player starts with \$800 to spend on his or her fighter, and it is not mandatory to spend it all. Any unspent money will be credited to the player's account, and reimbursed in the form of extra energy units in shielding.

Each menu of equipment has a selection of four different choices, as listed here. Each piece of hardware costs

from \$100-\$400, so budget your money wisely. If you overspend on the first two menus and have no money left on the third menu, you will be issued a standard space corps hydrogen fuel booster (which crawls along like a covered wagon in space). So be sure to save some for your engine, which is the last and most important piece of equipment.

If you select the fastest engine, the Halycon overthruster, look out! You will fly around so fast you'll find it hard even to get

IRS ACCEPTABLE
Double Entry
Accounting System

Bookkeeping Made Easy. . .

NEW FOR RESTAURANTS

THE ACCOUNTANT™

KFS's Preferred* Accounting System Now Includes a
Restaurant Accounting Package Written
Exclusively for Commodore 128™

\$149⁹⁵

THE ACCOUNTANT™
Basic Accounting Package

Standard Accounting Features:

- General Ledger
- General Journal
- Check Register
- Over 20 Reports Automatically
- Payroll Computation & Write-up
- Payroll Check Writing
- W-2 Printing
- Quarterly Report
- Accounts Receivable "Filing System"
- Customer Statements
- Accounts Payable "Filing System"

\$199⁹⁵

Combo Package
THE ACCOUNTANT™ plus
RESTAURANT ACCOUNTING
PACKAGE

Advantages for Restaurants:

- 800 Inventory Items - 26 Classifications
- Prints Physical Inventory Worksheets
- Handles Food Cost & Payroll
- "SPREADSHEET" Cost for 99 Menu Items
- 60 Employees
- "Single Line" Inventory Changes
- Tips, Gratuities & Meals Figured
- Automatically Computes Minimum Wage Requirements

* "Commodore's Microcomputers Magazine, Independent Reviewers,
Rated **THE ACCOUNTANT™** — "#1 in Preference"—
for Commodore 128™ Productivity"

KFS Software, Inc.
1301 Seminole Blvd. #117
Largo, Florida 33540

For C.O.D. Orders Phone:
(813) 584-2355

(FL Residents add 5% Sales Tax)
(All figures in U.S. Dollars)

Reader Service No. 151

NEW

KRACKER JAX® REVEALED!

THE BOOK

At last—**Kracker Jax** takes you beyond the protection barrier! The secrets of un-protecting software are yours with **Kracker Jax** revealed!

We'll show you exactly how to defeat five different protection schemes encompassing scores of current programs. Our tutorial has twenty specific examples to lead you, step by step, to a new level of knowledge. Here's what you get:

- **Kracker Jax** revealed.
- A reset switch.
- A utility disk.
- 20 parameters on disk.

ONLY \$23.50 COMPLETE!

Orders outside of North America
Please add \$7.50 for shipping and handling.
Please allow two weeks for delivery.

Flash— KRACKER JAX voted "MOST INNOVATIVE COPY PROGRAM OF 1986" by The Guide Magazine!

AND HERE'S WHAT SOME OF OUR CUSTOMERS HAVE TO SAY ABOUT US:

"I really enjoy doing business with you—your attitude is great!" Richard Libby.
"Very impressed with your product—thanks." Larry Lyman, Director, Green Mountain Commodore User's Group.

"I am excited about **Kracker Jax** Revealed—thanks again for the great product & great service." Jerry Pectol.
"Very nice utility—about time someone looked out for us." John Dale, President, Wiregrass Micro-Comp Society.

See our reviews in the Jan. '87 Ahoy! and in the Dec. '86 issue of The Guide.



ARE YOU CAUGHT UP IN THE COPY PROTECTION ARMS RACE?

DEFEND YOURSELF WITH **KRACKER JAX®**
A REVOLUTION IN ARCHIVAL SOFTWARE!

Kracker Jax is the powerful parameter copy system that is taking the country by storm! What is a parameter? It's a custom program that allows your 1541 or 1571 disk drive to strip all copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN back-ups that can even be copied with a simple fast copier. Each Volume costs \$19.95 and will un-protect around 100 titles. So why pay for backups of programs that you already own?

Check out some of these exclusive features:

- **Kracker Jax** is the BEST program of its kind!
- **Kracker Jax** will back up titles that the nibblers CAN'T!
- **Kracker Jax** requires NO special knowledge to operate!
- **Kracker Jax** strips protection in a matter of SECONDS!
- **Kracker Jax** is priced RIGHT—just \$19.95 per Volume
- **Kracker Jax** is UNPROTECTED—easy to back up!
- **Kracker Jax** updates are available QUARTERLY!

➤ VOLUME FIVE INCLUDES A POWERFUL NEW C64/C128 FAST COPIER! ➤



ALL NEW VOLUME FIVE

VOL. 1-4 STILL AVAILABLE. ONLY \$19.95 EACH!



THE SHOTGUN

Those of you who have used our **Kracker Jax** parameters know just how good they are. Can you imagine the kind of nibbler we could put out? Well, you don't have to imagine it because it's HERE! **THE SHOTGUN**, our new premium nibbler utility, is available two ways:

Whichever version you order, you'll find **THE SHOTGUN** to be loyal to the **Kracker Jax** tradition of more quality for less money.

- **THE SHOTGUN** by itself—offered to you at the unheard of introductory price of only \$14.95!
- **THE LOADED SHOTGUN**—Packaged WITH 32 of the most popular **Kracker Jax** parameters ever created—only \$19.95!

THE MSD DUAL CANNON

MSD owners aren't left out in the cold anymore! The all new **MSD DUAL CANNON** gives you state of the art control over your advanced equipment! You get:

- A **NIBBLER**—for backing up your protected programs!
- A **FILE COPIER**—for easy file maintenance and manipulation!
- A **SECTOR EDITOR**—developed just for the MSD dual drive!
- And a **FAST COPIER**—that WON'T transfer errors—perfect for use with data disk or **Kracker Jax** parameters!

Start getting the full performance that your MSD drives are capable of delivering. You already know you own the finest drives available—so why settle for anything less than the best utilities made for them?

Get the most out of your special equipment—only \$34.95!

ON-LINE HELP

Are you programming in BASIC? Let your C-64 help you! Forget about all those tattered books and charts—just load **ON-LINE HELP** in at the beginning of a session. Then, at the touch of the F1 key, you're given a menu of available help screens to choose from! When you return to BASIC, you're right back EXACTLY where you left off!

ON-LINE HELP gives you 17 screens of info at the touch of a button, including: ASCII character set/POKES/color codes/selected DOS commands/useful memory commands/BASIC keywords, abbreviations, and token values/sound registers/musical notes in all 8 octaves/location 197 last key pressed.

Never waste time hunting for basic information again—only \$19.95

SUPER CAT

If you had the time and skill to create your own custom disk catalog system, the paramount system of your wildest dreams, it probably STILL wouldn't have all the features of **SUPER CAT**! For example: • Catalog up to 640 disk directories—1280 with 2 drives! • Index & alphabetize over 5000 titles—10000 with 2 drives! • Unique ID's are NOT necessary! A printer is NOT required! • Find ANY title in 10 seconds—sort 1000 titles in 8 seconds! • Automatic entry with Selection, Edit, and Cross Ref. options! **SUPER CAT** has literally too many features to fit in here. From the easy, menu driven work screens to the comprehensive output options, **SUPER CAT** is the most powerful and complete disk catalog system available today!

The ultimate software library index system—only \$24.99

THE C-128 CANNON

Here's the package you C-128 owners have been waiting for! The **C-128 CANNON** gives you more power than you ever hoped for! Just look at some of these capabilities:

- **NIBBLER**—Works with single or dual 1571/1541 drives!
- **FAST COPIER**—Great for data disks or use with **Kracker Jax**!
- **FILE COPIER**—Makes file maintenance and manipulation easy!
- **1581 FAST COPIER**—For use with the new high speed 3.5" drive!
- **1581 FILE COPIER**—For high speed file manipulation!
- **MFM COPIER**—Copies unprotected IBM and CP/M disks!
- **T/S EDITOR**—Works with 1541, 1571, and the new 1581 drives!
- **ERROR SCANNER**—Complete with on-screen display!
- **DENSITY SCANNER**—Check for altered densities track by track!
- **DIRECTORY EDITOR**—Alter & organize your disk directories!
- **KRACKER JAX**—You also get 100 of our most popular parameters!

You've seen nibblers alone that sold for thirty-five or forty dollars. And the 100 **Kracker Jax** parameters are a twenty dollar value. Yet the ENTIRE **C-128 CANNON** utility package sells for just \$34.95. Never before has this much power and control been integrated into a single, affordable product. If you own a C-128, you deserve the **C-128 CANNON**!

C-128 owners, this is the package
of your dreams—only \$34.95

COMPUTER MART

Need more info? Call or
write for our free catalog

Program submissions wanted!
Good Commissions—
National Marketing.

CHECKS, MONEY ORDERS OR VISA/MASTERCARD.

Mail your order to: Computer Mart, Dept. A
2700 NE Andresen Road/Vancouver, WA 98661
Phone orders welcome: 206-695-1393
Same day shipping/No C.O.D. orders outside U.S.



PLEASE NOTE: Free shipping & handling on all orders • C.O.D. add \$3.00 to total order • All orders must be paid in U.S. funds.

your opponents in your sight. However, you will be able to dodge his fire easily if you are dexterous.

When you play the game the first couple of times, expect several midair collisions with your opponent before you get the hang of it. It's easy to smash into each other with all that zooming and wrapping around. Midair explosions end the game in a stalemate and take you back to the menu.

You will each start out with 100 units of energy (ERG) in your shields, which may be more if you save some money from purchases.

Your missiles, launched by using the fire button, orbit the planet continuously until they hit something, so watch out for your opponent's fire wrapping around and hitting you from behind.

Space travel also wraps around the screen, but collisions will not occur unless both ships are touching on the visible screen! Use this wraparound to hide, or to come up behind your opponent.

You are safe from your opponent's fire if your ship is cruising below the level of the cliffs and mountains on the planet, and this feature may occasionally come in handy to rest up from battle for a few seconds.

The game is completely in BASIC, and you will probably be amazed at how incredibly fast and responsive

it is in lieu of machine language. Actually this is my eighth game on the C-128, and it took all that experience to get the machine to run this way. There is a great deal about the C-128 that only trial and error can teach, and I had to learn from my mistakes before I could program a game like this. I hope you find it representative of Commodore's extensive advertising for "arcadelike" games in BASIC 7.0!

The first time you run the game, the program takes about 40 seconds to draw the hi-res image, but after that it will leave the picture on the screen, so there is little to no wait for the second round of combat. A friend of mine and I battled it out for 20 minutes before finally finishing a round, so I think you will find it challenging.

Experiment with different ship configurations until you get a fighter that handles the way you want, and then try modifying that ship to see if you can get an advantage over your opponent's design. The game can be a great deal like "scissors-rock-paper," with the design of your opponent's ship directly affecting the success of your own fighter craft, so there is definitely a great deal of strategy as well as dexterity involved in the game.

RUN STOP/RESTORE exits the game. Have a blast playing *Planet Duel*. □

SEE PROGRAM LISTING ON PAGE 105

GREAT PRODUCTS FOR YOUR COMMODORE

promenade C1™

The Eprom Programmer. Thoughtfully designed, carefully constructed, the *promenade C1™* is respected around the world for quality and value. The original software controlled programmer does away with personality modules and switches. Intelligent programming capability can cut programming time by 95%! With Disk Software..... still just \$99.50

CARTRIDGE MATERIALS:

CPR-3 - Three socket board, case and 3 eproms, for use with CAPTURE™	29.95
PCC2 - Two 2732 (4K) or 2764 (8K) eproms. For '64 or '128 in 64 mode	4.95
PCC4 - Four sockets for 2764, 27128 or 27256 (32K) eproms. Bank switching	17.95
PCC8 - Like the PCC4 but twice the capacity. For multiple programs	29.95
PRB4 - Four sockets, eprom & battery backed RAM combination	24.95
PTM2 - Basic 128 mode cartridge board. Two 2764 or 27128 eproms	5.95†
PTM4 - Four sockets, 27128 & 27256 eproms. 128 mode bank switcher	19.95†
PCCH2 - Plastic case for above cartridges (except PCC8)	2.25
Eproms - Always in stock at competitive prices.	

CAPTURE™ is a bargain at 39.95

†available June '86.

*when in 64 mode.

EPROM ERASERS:

Datarase - Hobbyist eprom eraser, 2 at a time, 3 to 10 minutes	34.95
PE14 - Industrial quality eraser, 7 to 9 at a time	79.95
Starter Set - CAPTURE™ , <i>promenade C1</i> and one CPR3 kit	149.95
Deluxe Set - CAPTURE™ , <i>promenade C1</i> , Datarase and two CPR3 kits	199.95

SHIPPING & HANDLING: USA - UPS SURFACE \$3.00

FOREIGN (AIR MAIL ONLY) \$13.00



JASON-RANHEIM

1805 INDUSTRIAL DRIVE
AUBURN, CA USA 95603

TO ORDER TOLL FREE 800-421-7731
FROM CALIFORNIA 800-421-7748
TECHNICAL SUPPORT 916-823-3284
FROM OUTSIDE USA 916-823-3285
MC, VISA, AMEX WELCOME

Reader Service No. 123

INFOFLOW



Icon Database for the C-128 By Cleveland M. Blakemore

The C-128 is a personal computer that seems to lend itself to interesting new ideas. It has a way of bringing out a sort of experimental spirit in a programmer. One minute you're just puttering around on the keyboard, and the next thing you know you've worked out the basic structure of a program.

This is partly due to the fact that the version of BASIC on the C-128 is the most comprehensive, simplest language ever to come packaged with a micro. It is very easy to visualize programs in terms of commands and routines, and because there are so many available instructions there seems to be a good one for any situation that might arise.

If you're familiar with the Macintosh or Amiga, you already know what an icon-based system is and how it works. It is quite simply a menu of pictures instead of words. Rather than typing in a numeric choice, you use an arrow or pointer to select different pictures, and program flow is directed to the appropriate subroutine.

Most of these systems come packaged with a device called a mouse. A mouse is a small box with a trackball on the bottom that is rolled on a smooth surface to control the onscreen arrow. Although the following program is designed to work with the C-128's new mouse, the I350, it will also work with any quality joystick plugged into Port 2.

The program takes a few seconds to boot up, as it has to POKE some data into memory. The screen will blank for a moment during this, and when it reappears you will be looking at the screen of *Infoflow*, an icon-operated database.

I confess I designed *Infoflow* for myself, as an alternative to many of the commercial databases I have owned. I incorporated all those features that were important to me; in fact, I tried to consolidate the best of all the databases I have ever used into one really terrific information filing system. I hope you will find it suitable for your needs, but you may miss certain features that would normally be there that I consider superficial. Since I use it mostly for addresses, dates, and record keeping, I designed it around these functions, and tried to keep it as

streamlined and simple as possible. You will probably gather after a few minutes that I am a person who insists on doing things fast, fast, fast—and you would be right.

Before we go on, perhaps it would be best to briefly describe a database system and how it works for those of you who may be unfamiliar with them. A database is a software environment that is used to keep track of information, and to organize and store it in such a way as to make the information useful to human beings.

All databases have several things in common. They have the capability to add information, modify existing information, and delete, sort, list, search through, and print out information.

Usually the information is organized in a manner similar to information systems maintained physically on paper or some other medium. This would naturally mean something like filing cabinets, with drawers and folders. Since this type of system is easier to visualize for human beings, we'll be using this format for our database. You can think of each different file, with categories like Friends, Record Collection, or Important Dates, as being a drawer in a file cabinet. Now each folder in this file cabinet would be a RECORD, and each record would have several fields, or categories of information.

For instance, in a drawer called PERSONAL DATA, we might have 50 records. Each record might have three fields, e.g. Name, Address, Phone Number. Each field should have an entry, so that any time we wanted we could find information for that record, like the phone number of one of our friends, in the record with his name.

Now that we have a rudimentary understanding of databases, let's delve into *Infoflow* and see what makes it so different from other programs like it.

To select a choice from the menu, you merely move the arrow to the icon until it is touching (the arrow begins to "bump" or "stick") and push the button on your mouse or joystick.

There are eight icons to choose from on the screen. The upper four icons are labeled "SAVE/LOAD" (disk drive with disk above it), "NEW FILE" (filing cabinet),

PHOTO: MICHAEL R. DAVILA

"DELETE" (trash can), and "VIEW/ADD" (eyeball).

The lower four are labeled "SORT" (file cabinet with letters "ABC" beside it), "SEARCH" (picture of several folders with arrow running alongside them), "HARD-COPY" (arrow pointing to manuscript), "CURRENT RECORD" (file cabinet with drawer open and folder to left side).

We'll begin by creating a small database, to get a feel for the system. It's best to start out with something simple to experiment with.



Our filing cabinet is empty when the program first starts, so we'll either have to load in an old file we have previously created or initialize a new file. Since this is our first time in *Infoware*, we select the icon "NEW FILE". There is a

buzz, and we see the prompt "Filename", indicating *Infoware* needs to know what we are going to call the new file we are creating. We'll type in "Personal" and hit RETURN.

You'll notice that the input routine does not have a flashing cursor or question mark. That's because it's a special input routine that accepts commas, colons, and even quotation marks, putting *Infoware* a notch above other databases in this respect. Using commas in addresses and lists is often very important, but BASIC 7.0 normally issues an EXTRA IGNORED error when it finds a comma in the input buffer. *Infoware's* input routine also ignores all cursor movements and control characters, accepting only alphanumeric input. The only control keys functioning are the DELETE key to back up over mistakes, and the RETURN key. This input routine saves a lot of hassle and trouble normally associated with BASIC's input command. *Infoware* also uses GET# to retrieve and save information to disk, because INPUT# does not properly receive strings with embedded commas.

Since *Infoware* prefixes files on the disk with an "IF" to identify only those files pertinent to it, filenames are limited to 10 characters or less. This should not prove to be a problem unless you have similar files you want to save and 10 characters is not enough to give them distinctive names. You could label one file in uppercase and the other in lowercase if you have such a problem.

After typing in the filename, you will be asked for the number of fields. Type in "3" (Name, Address, Phone) and hit RETURN. The maximum number of fields permitted is 99. Now the program prompts you for the Name and Length of each field. Type in the name of each field and the maximum length, in characters, you will want each field to be limited to. If you are not sure, the default is 160. Hit RETURN at the length prompt if you want the field to default to 160 char-

acters. The max length for any field is 254 characters, which is pretty darn big, a lot bigger than the normal BASIC input buffer can even handle!

Now the computer will approximate how many records can be held in memory simultaneously and ask you if you want to proceed. If you like the file you have designed, hit "a" for accept. If you hit "r" the program will return to the main menu without creating the file.

When you return to the icon command screen, you will notice that "CURRENT RECORD" has been set to "1" and that the available record space left in memory is displayed at lower right, to keep you informed of how many more records you can fit into this file.

Now that we have a file created, let's go to "VIEW/ADD" and start putting something into it. Once you enter "VIEW/ADD", you will find yourself looking at the record number set in "CURRENT RECORD". You can flip forward through the records by moving the mouse or joystick right, and you can go back by moving it left. If you push your controller up, you will be in "INSERT/MODIFY" mode, at which time you can make new entries in each field or hit RETURN to leave the previous entry for that field unchanged. You will be limited to the maximum number of characters for that field that you set when you create the file. If you go over the 40 column line length, the screen will be scrolled down to make room for your input.



Each field is staggered one row to the right going down, to make each one more locatable.

If you enter a new record at the end of the file, the end-of-files pointer will be bumped up by one.

Each time you enter a new record at the end of the file, the pointer will be bumped up by one to make room for another entry. The first field of each record is considered the "header"—if this header is blank, the record is considered blank. In order to make a new entry, you must put something in the header.

To exit from "INSERT/MODIFY", hit the button on your controller to return to the icon screen. You will notice that the last record you accessed will be set beneath the "CURRENT RECORD" icon.

It may seem too slow to move to the record you want in "INSERT/MODIFY". You may want to jump around very quickly in a large file, from record to record. This is the purpose of the "CURRENT RECORD" icon. Move

your arrow to it and push the button. Now you can move rapidly forwards and backwards with your controller through the record numbers. For a fast change, move it left or right. For a really fast change, move up to count by tens through the records forward, or down to count backwards by tens. Once you have the record you want



Software Discounters of America



For Orders Only—1-800-225-7638

PA Orders—1-800-223-7784

Customer Service 412-361-5291

• Free shipping on orders over

\$100 in continental USA

• No surcharge for VISA/MasterCard

• Your card is not charged until we ship

ABACUS BOOKS

C128 Basic 7.0 Internals
C128 Internals CALL
C128 Peeks & Pokes FOR
C128 Tricks & Tips PRICES
CPM 128 User's Guide

1571 Internals

GEOS—Inside & Out

ABACUS SOFTWARE

Assembler Monitor (D) \$25

Basic (D) \$25

Basic 128 \$39

Cad Pak (D) \$25

Cad Pak 128 \$39

Chart Pak 128 \$25

Cobol (D) \$25

Cobol 128 \$39

Forth (D) \$25

Personal Portfolio

Manager (D) \$25

Power Plan (D) \$25

Speed Term 128 \$25

Super C (D) \$39

Super C 128 \$39

Super Pascal (D) \$39

Super Pascal 128 \$39

ACCESS

Executive Leader Board

Tourn. Disk \$14

L.B. Famous

Course Disk \$14

Leader Board Golf (D) \$25

Leader Board

Tourn. Disk #1 \$14

Robotics Workshop

Tenth Frame (D) \$25

Triple Pack: BH1, BH2, Rald

Over Moscow (D) \$14

ACCOLADE

Ace of Aces (D) \$19

Dambusters (D) \$19

Flight Night (D) \$19

Football (D) \$19

Hardball (D) \$19

Killed Until Dead (D) \$19

PSI-5 Trading (D) \$19

ACTION SOFT

Thunder Chopper (D) \$19

Up Periscope (D) \$19

ACTIVISION

Aliens (D) \$23

Cross Country Road

Race (D) \$19

Gamemaker Library Disks

Sports \$14

Science Fiction \$14

Gamemaker (D) \$25

Greeting Card Maker (D) \$23

Hacker 2 (D) \$23

Little Computer

People (D) \$23

Music Studio (D) \$23

Portal (D) \$23

Shanghai (D) \$23

Tass Times (D) \$23

Transformers (D) \$23

ARTWORX

Beech Blanket

Volleyball (D) \$9.88

Bridge 4.0 (D) \$16

Data Disk #1 Female \$14

Data Disk #2 Male \$14

Data Disk #3 Female \$14

Equestrian Show

Jumper (D) \$9.88

Highland Games (D) \$9.88

Hole in One + 6 (D) \$9.88

International Hockey (D) \$16

Police Cadet (D) \$9.88

Strip Poker (D) \$21

Thai Boxing (D) \$9.88

AVALON HILL

Dr. Ruth (D) \$19

MacBeth (D) \$16

Super Sunday (D) \$21

SBS 1985 Team Disk \$14

SBS Champs Disk \$14

Splitfire '40 (D) \$23

Title Bout (D) \$19

Tournament Golf (D) \$19

AVANTAGE

Desert Fox (D) \$9.88

Deceptor (D) \$9.88

Spy vs. Spy 1 & 2 (D) \$9.88

BATTERIES INCLUDED

Consultant (64 or 128) \$36

Paperclip w/Spell (D) \$29

Paperclip II 128 \$49

BERKELEY SOFTWARE

Geos 128 \$39

Geos 64 (D) \$39

*Geo-Calc (D) \$33

*Geo-Chart (D) \$33

*Geos Desk Pak 1 (D) \$23

*Geos Desk Pak 2 (D) \$23

*Geo-Dex (D) \$25

*Geo-File (D) \$33

*Geos Font Pak (D) \$19

*Geos add-on programs only!

BRODERBUND

Bank St. Series \$39

Carmen Sandiego (D) \$23

Karateka (D) \$19

Print Shop (D) \$26

P.S. Companion (D) \$23

P.S. Graphics Library

#1, #2, or #3 \$16 Ea.

P.S. Graphics Library

Holiday Edition \$16

Toy Shop (D) \$39

CBS

Body in Focus (D) \$23

Mastering the SAT (D) \$44

Math Mileage (D) \$6.88

Rich Scarry's Electronic

Word Book (D) \$12

Sesame St. Pals

Around Town (D) \$9

Success w/Algebra Call

Success w/Math Call

Timebound (D) \$6.88

CDA

America Cooks Series:

American (D) \$9.88

Chinese (D) \$9.88

DATA EAST

Commando (D) \$23

Express Raider (D) \$23

Ikari Warriors (D) \$23

Karate Champ (D) \$23

Kung Fu Master (D) \$23

Tag Team Wrestling \$23

DAVIDSON

Algebra (D) \$33

Math Blaster (D) \$33

Speed Reader II (D) \$33

Spell It (D) \$33

Word Attack (D) \$33

ELECTRIC DREAMS

Rocky Horror Show (D) \$19

Spindizzy (D) \$19

Titanic Recovery

Mission (D) \$19

Zoids (D) \$19

ELECTRONIC ARTS

Software Classic Series:

Archon (D) \$9.88

Heart of Africa (D) \$9.88

Mall Order

Monsters (D) \$9.88

M.U.L.E. (D) \$9.88

Musical Const. Set (D) \$9.88

One-on-One (D) \$9.88

Pinball Const. Set (D) \$9.88

Racing Dest. Set (D) \$9.88

Seven Cities Gold (D) \$9.88

Super Boulder

Dash (D) \$9.88

Touchdown

Football (D) \$9.88

ELECTRONIC ARTS

Adv. Const. Set (D) \$26

America's Cup

Sailing (D) \$23

Amnesia (D) \$26

Archon 2: Adept (D) \$23

Arctic Fox (D) \$23

Balakon Raider (D) \$23

Bard's Tale 1 (D) \$26

Bard's Tale 2: The

Destiny Knight (D) \$26

Battlefront (D) \$26

Chessmaster 2000 (D) \$26

Lords of Conquest (D) \$23

Make Your Own

Murder Party (D) \$23

Marble Madness (D) \$23

Movie Maker (D) \$23

Scrabble (D) \$23

Skyfox (D) \$23

Star Fleet I (D) \$26

Timothy Leary's

Mind Mirror (D) \$23

Ultimate Wizard (D) \$19

EPYX

Barbie (D) \$9

Champ. Wrestling (D) \$23

Destroyer (D) \$23

Fast Load (R) \$23

Gateway to Asphalt (D) \$9

Impossible Mission (D) \$9

Jumpman (D) \$9

Movie Monster (D) \$23

Multipan 128 \$33

P.S. Graphics Scrapbook 1:

Sports (D) \$16

P.S. Graphics Scrapbook 2:

Off the Wall (D) \$16

Summer Games 2 (D) \$23

Super Cycle (D) \$23

Winter Games (D) \$23

World Championship

Karate (D) \$17.95

World Games (D) \$23

FIREBIRD

Elite (D) \$19

Starglider (D) \$25

The Pawn (D) \$25

Tracker (D) \$25

FISHER PRICE

Alpha Build (R) \$6.88

Dance Fantasy (R) \$6.88

Hop Along

Counting (R) \$6.88

Linking Logic (R) \$6.88

Memory Manor (R) \$6.88

Sea Speller (R) \$6.88

*Buy 3, get 1 free!

GAMESTAR

Championship

Baseball '88 \$23

Champ. Basketball (D) \$23

Star Rank Boxing (D) \$19

GFL Championship

Football (D) \$23

On-Court Tennis (D) \$19

HES

Microsoft Multiplan (D) \$19

Project Space

Station (D) \$19

HI-TECH EXPRESSIONS

Card Ware (D) \$6.88

Heart Ware (D) \$6.88

Party Ware (D) \$9.88

INFOCOM

A Mind Forever

Voyaging 128 \$23

Ballyhoo (D) \$25

Enchanter (D) \$23

Hitchhiker's Guide to

the Galaxy (D) \$23

Hollywood Hijinx (D) \$25

Leather Goddesses \$23

Moonmist (D) \$23

Suspect (D) \$25

Trinity 128 \$25

Wahsbringer (D) \$23

Zork 1 (D) \$23

Zork 2 or 3 (D) \$25

KONAMI

Yle Ar Kung Fu/

Rush 'N Attack (D) \$19

MASTERTRONIC

Action Biker (D) \$6.88

Bouncer (D) \$6.88

Captain Zap (D) \$6.88

Electra Glide (D) \$6.88

Infinity Machine (R) \$12

5-A-Side Soccer (D) \$6.88

Knight Games (D) \$6.88

Last V-8 (D) \$6.88

Magnum Joystick \$12

set beneath the icon, hit the button to exit. Now this is the first record you will examine if you enter "VIEW/ADD" again.

If you want to get rid of some old records in a hurry, select "DELETE", the trash can. You will be prompted to delete the Current record, Scan, or All Records. Hit "c" and the current record number will be erased. If you hit "s", you will be able to flip through the records as in "VIEW/ADD", and select records to be deleted by pushing SHIFT-D. Hit SHIFT-E to exit. You will notice that whenever a record is deleted, all the records above it are moved down to fill in the blank, and the end-of-file pointer is decremented by one.

If you select "a" for ALL records, the program will verify with a "Yes-No" prompt in case you have second thoughts. Otherwise the whole file will be erased irretrievably from memory, and you will be returned to the icon screen.

You will probably want to "SORT" your records alphabetically sooner or later, and there is a very fast Shell-Metzner sorting routine in the program for just this purpose. Select the field you want the sorting routine to use for comparisons (defaults to header) and the screen will go blank and flash for a few moments while the computer goes into FAST mode. The program returns with "SORT COMPLETE" before you are returned to the icon screen.

If you are looking for a certain entry, group of letters,

PROGRAMS NEEDED

Our need for top quality games, utilities, and productivity programs remains high...and our payment rates are higher than ever. Send your best work on diskette, accompanied by a print-out, introductory article, and self-addressed stamped envelope to:

Ahoy! Program Submissions Dept.
Ion International Inc.
45 West 34th Street—Suite 407
New York, NY 10001

or subject in your database file, you will want to use the "SEARCH" icon. The maximum length of the string to search for is 24 characters. After you hit RETURN, the program will display every occurrence of that string in your file, at which time you can either modify or insert information for that entry, just like in "VIEW/ADD". Each time you hit the button, the computer will begin the search again, displaying each occurrence of that string until it reaches the end-of-file marker.

If you are going grocery shopping, or you want to call each customer you have in your database, you will need a "HARDCOPY". The program prompts you for the range of records you want printed. The defaults are the beginning and ending markers for the file. The hardcopy will be aborted if the printer is not turned on.

After all this arrow moving and clicking, you may want to wrap things up and call it a day, so go to "SAVE/LOAD" and save your file to disk. Any existing file with the same name will be scratched and replaced with the new one.

Now that your data is safe on the disk, move your arrow to the lowest line on the screen and hit the button. The "QUIT?" bar lights up. Moving your arrow in any other direction will take you back to the screen, but clicking the button twice exits *Infowin*.

The "SAVE/LOAD" routines and all I/O are extensively monitored for errors to prevent system crashes if the printer is off-line, or the drive device number is wrong, etc., but certain syntax and logic errors are allowed because of the fact that you may make a mistake in typing the program in.

Even the RUN STOP key is disabled, so your data is perfectly safe until you either exit the program with "QUIT" or hit RUN STOP/RESTORE.

I hope you find *Infowin* indispensable for the C-128 utility library. Since it is one of the first utilities I have created for *Ahoy!*, I tried to make it as useful as possible. If you have any suggestions, modifications, or additions, please let the rest of *Ahoy!*'s readers in on the secret, and me too, by writing. □

SEE PROGRAM LISTING ON PAGE 96

NEW! NEW! NEW! NEW! NEW!

HACK PACK

The ultimate utility pack for the 128

RAM DISK responds to all the usual commands such as DLOAD, DSAVE, DOPEN, COPY, APPEND, CATALOG, etc. and behaves exactly like a floppy disk—except at lightning speed and is accessible from BASIC or machine code.

TOOLKIT adds eight valuable new commands to make your BASIC programming more enjoyable and effective.

COMPRESSOR reduces your programs to minimum size making your code smaller and faster and protecting your programs from unauthorized tampering.

C128 GREAT VALUE \$39.95

C64 - Over 1000 happy users worldwide \$34.95

OXFORD PASCAL

- Full standard Pascal & extensions
- Fast...to compile and run
- Resident (in Ram) and disk compiler
- Graphics and sound extensions
- 84 page tutorial/reference manual • Full linker
- Powerful Editor • Compact Code • Stand alone compiled programs

OXFORD PASCAL includes two compilers:

- One that runs in RAM just like a BASIC interpreter. Great for learning and debugging.
- A full disk compiler which lets you use the whole of memory for PASCAL programs

C128 Uses entire 128K memory \$49.95

C64 Over 5000 satisfied users worldwide \$29.95

PETSPED BASIC COMPILER

- UP TO 40 TIMES THE SPEED OF BASIC
- Compiles all commands
- Compatible with machine code
- Makes big programs small
- Extensions to BASIC
- Long variable names
- Recommended by Commodore

C128 Compiles all BASIC 7.0 Handles four extensions \$49.95

METACOMCO

5353 E Scotts Valley Drive • Scotts Valley, CA 95066
Tel: (US) 800-AKA-META (CA) 800-GET-META
BIX: mhill Compuserve: 73247,522 • Add 6½% tax if CA resident

Reader Service No. 129

COMMODORING FOR THE CUP

Two Simulations Sail the Silicon Seas

Hoist the sails, and over the bounding main we go! Old salts and young sea dogs can captain crews in the America's Cup race in simulations so real that landlubbers may become seasick before the Commodore gets back to dry land.

After 132 years of undefeated American yachtsmanship, the *Australia II* won the America's Cup match and took the Louis Vuitton Cup Down Under. The rematch, which climaxed in February 1987, has inspired two computer simulations.

The American Challenge: A Sailing Simulation (Mindscape) lets the computerist race a sailboat through seven increasingly difficult courses. Only after these are completed is the electronic skipper ready for a simulation of the America's Cup Race.

An onscreen instrument panel helps the computer captain monitor wind direction, wind speed, and boat heading. The sail, rudder, and centerboard are operated with keyboard commands.

The American Challenge, designed by Tom (*The Halley Project*, *Agent USA*, *Snooper Troops*) Snyder Productions, offers a choice of boat, course, and racing opponent. The computerist chooses to race the sailboat or a motorboat (a good way to learn about each course before trying it with the sailboat), then selects an appropriate opponent. Two computers can be connected by cable or via telephone modem for head-to-head racing, though each gamer must have *The American Challenge* game disk. With this setup, each yachtsman sees a representation onscreen of the other player's boat.

Solitaire gamers race against their own best previous performance, or

the champion's time. In the one-player mode, the screen pictures a ghost boat so the skipper can see who's in the lead. The computer images of the opposition's sailboat can be toggled off and on at will.

All races in *The American Challenge* start with the wind from the North, and the boat facing West, sail unfurled. The starting line to the North is stretched between two buoys,



with the ship at "standstill."

Simple keyboard commands control the craft. Pressing "F" or "D" pulls the sail in quickly or slowly, respectively, while "S" and "A" let the canvas out slowly or quickly. Touching "J" turns the boat to the left, "K" stops the turn, and "L" turns the boat to the right. Hitting "C" raises and lowers the centerboard (the board that runs vertically along the boat's hull to provide stability).

Before the race begins, the gamer sees a chart with the layout of the course. It identifies the general path the boat must take as a line which traces the route of the defending champion. Toggling the space bar at any time during the competition

Featured This Month:

Commodoring for the Cup	41
New Baseball Games in Town ..	44
Howard the Duck	47
Titanic: The Recovery	
Mission	48
Video Vegas	50

By Joyce Worley

brings up the chart with the current positions of the two boats. After the race is finished, the chart reappears to display the actual courses of the winning and losing boats.

At the beginning of the competition, the gamer sees the boat from directly behind. Each press of an arrow key changes the perspective by

The Official America's Cup Sailing Simulation approximates the actual '87 race. Three skill levels vary weather conditions, time, and skill of computer foe. READER SERVICE NO. 131

45 degrees. This permits the gamer to look to starboard, port, or even the stern of his or her own sailboat.

Sea and sky dominate the screen. Silicon Bay, where all races are staged, is circled by a few scenic highlights, including a bridge, lighthouse, towns, and hills. These add visual interest to the essentially boring display, and aid in navigation.

The American Challenge depicts the boat as an outline reminiscent of vector graphics, rather than as a filled-in image. It looks almost ghostly against the seascape, while providing mechanically accurate views of the sailboat's rigging.

The lower third of the screen holds the instrument panel. A compass,



LYCO COMPUTER

MARKETING & CONSULTANTS INC.



OVER 2000 SOFTWARE TITLES IN STOCK!

ALIENS \$24.75

Portal	\$26.95
Titanic	NEW!
Labrynth	\$22.75
Aliens	\$24.75
Hacker	\$18.75
Hacker II	\$20.75
Little People	\$20.75
Game Maker	\$24.75
Music Studio	\$22.75

ACTIVISION

Movie Monster	\$24.75
Vorpol Kit	\$15.75
Fast Load	\$24.75
Summer Games II	\$24.75
Super Cycle	\$24.75
World Games	\$24.75
Football	\$24.75
Multi-Plan	\$24.75
Winter Games	\$24.75

EDUX

TIMEWORKS

Data Mgr.	\$42.95
Swiftcalc	\$42.95
Wordwriter	\$42.95
AJ Payable	\$38.95
AJ Receivable	\$38.95
General ledger	\$38.95
Inventory	\$38.95

Broderbund Software®

Printshop	\$25.75
Graphics Lib. EA	\$15.75
Print shop paper	\$12.75
Bank st writer 128K	\$32.75
Carmen Sandiego	\$22.75
Karateka	\$18.75
Print shop comp	\$22.75
Science kit	\$35.75

PRINT SHOP \$25.75

SPRINGBOARD

Newsroom	\$32.75
Clip Art 1	\$18.75
Clip Art 2	\$24.75

JOYSTICKS

Bat Handle	\$16.75
Boss	\$11.99

SSI

Gemstone Healer	\$18.95
Gettysburg	\$36.95
Kampfgruppe	\$36.95
Phantasia 2	\$24.95
Ring of Zelfin	\$24.95
Road War 2000	\$24.95
Shard of Spring	\$24.95
Wizard's Crown	\$24.95

BATTERIES INCLUDED

Consultant	\$32.95
Paperclip w/spell pk	\$48.95
Paperclip II	\$(NEW)

xetec, Inc.

Font Master II 64	\$32.95
-------------------	---------

MicroProse

Acrojet	\$19.95
F-15	\$21.95
Gunship	\$27.95
Kennedy Approach	\$19.95
Silent Service	\$22.95
Solo Flight	\$19.95
Top Gunner	\$19.95

MicroProse

Micro L. Baseball	\$24.95
General Mgr	\$24.95
Stat Disk	\$15.95
'86 Team Disk	\$13.95
Wrestling	\$(NEW)

subLOGIC

Jet	\$31.95
Scenery Disk	\$17.95
Flight Sim II	\$31.95
Football	\$25.95
Baseball	\$31.95
Night Mission Pinball	\$21.95

UNISON WORLD

Art Gallery	\$15.95
Art Gallery 2	\$15.95
Print Master	\$22.95

PRINTER SUPPLIES

1000 9 1/2 x 11 white lazer	19.95
200 9 1/2 x 11 white lazer	5.95
3000 9 1/2 x 11 white	29.95

firebird

Colossus IV	\$21.95
Elite	\$19.95
Frankie Goes Holly	\$19.95
Pawn	\$28.95
Talking Teacher	\$28.95
Tackler	\$31.95

HI TECH

Card ware	\$6.75
Heart ware	\$6.75
Party ware	\$9.75
Ware with all	\$12.95
Holiday paper	\$8.95

DISK STORAGE

Flop-N-File 10	2.49
----------------	------

ACCESS

Leaderboard	\$24.95
MACH-5	\$23.95
MACH-128	\$29.95
10th Frame	\$24.95
Exec Tournament	\$13.95
Tournament 1	\$13.95
Triple Pak	\$14.95

AMIGA SOFTWARE

SSI

Computer Baseball	\$24.95
-------------------	---------

VIP

VIP Professional	\$115.00
------------------	----------

subLOGIC

Flight Sim II	\$32.95
Jet	\$(CALL)

firebird

Pawn	\$28.95
------	---------

ACTIVISION

Borrowed Time	\$26.95
Champ. Basketball	\$26.95
Champ. Golf	\$32.95
Hacker	\$26.95
Hacker II	\$29.95

ACCESS

Leaderboard	\$24.95
Tournament I	\$14.95
Portal	\$28.75

MicroProse

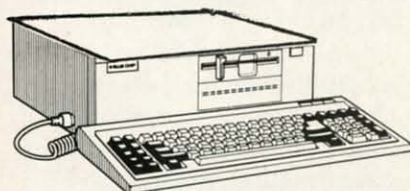
Silent Service	\$24.75
F-15	\$24.75

UNISON WORLD

Art Gallery	\$18.95
-------------	---------

LYCO'S SPECTACULAR SAVINGS!

BLUE CHIP ELECTRONICS



100%
IBM
COMPATIBLE

512K RAM (Random Access Memory) on the mother board. One 5.25 inch 360KB floppy disk drive included.

One serial (RS232C) communication port. (CALL FOR PRICING)

Panasonic Industrial Company



1080i

\$195.00



The 1080i puts quality Dot Matrix printing within reach even for a tight budget. So for a reliable printer at an affordable price, the 1080i is always a smart choice.



LYCO COMPUTER

MARKETING & CONSULTANTS INC.



SAVE ON THESE IN STOCK PRINTERS

star
MICRONICS



1-YEAR WARRANTY
NX-10 \$175.00
with purchase of printer stand
Limited offer

XETEX
Super Graphix... \$64.95
Super Graphix Jr... \$45.95
DSI
PPI... \$44.95
TYMAC
Connection... \$49.95

STAR MICRONICS

NX-10c	\$209
NL-10	\$219
NX-10	SPECIAL!
NB-15	\$889
ND-15	\$425
SR-10	\$429
NX-15	\$339

PANASONIC

1080i	\$195
1091i	\$269
1092i	\$335
1592	\$399
1595	\$499
3131	\$375
3151	\$399
1080AP	\$239

OKIDATA

Okimate 20 ST	\$189
120 NLQ	\$225
182	\$214
192+	\$365
193+	\$559
292	\$449
293	\$599

LEGEND

808	\$159
1080	\$199
1380	\$229
1385	\$289

SILVER REED

EXP 420 P	\$209
EXP 600 P	\$539

DIABLO

D25	\$519
635	\$799
D-80	\$1029

SAVE WITH THESE PRICES

SEIKOSHA

SP-1000 VC (C-64)	\$154
SP-1000 AP APiic	\$179
BP-1300 AI	\$369
BP-5420	\$1075
BP-5300 AI	CALL
Color Kit	\$119
BP-5420 ribbon	\$12.50
SP-1000 ribbon	\$8.50
SP-1200 AS	\$195
SP-1200 AI	\$195

EPSON

LX-86	\$209
FX-85	\$355
EX-800	\$449
EX-1000	\$579
FX-286	\$509
LO-800	\$449
LO-1000	\$659
FX-86e	\$399

CITIZEN

120-D	\$179
MSP-10	\$285
MSP-15	\$385
MSP-20	\$325
MSP-25	\$485
Premier 35	\$469

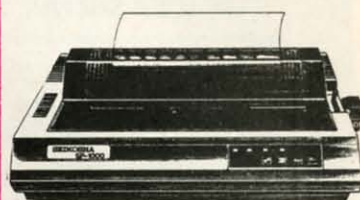
JUKI

Juki 6100	\$399
Juki 5510	\$435
Juki 6300	\$739
RS-232 serial board	\$55

TOSHIBA

321 P/S	\$479
351 sheet feeder	\$529
341 E	\$729
P341S	\$699
P351E	CALL

SEIKOSHA



1-YEAR WARRANTY
SP-1000 VC
\$154.00

D	MAXELL	5 1/4	3.5	D
I	SSDD	\$9.99	\$16.99	I
S	DSDD	\$12.99	\$23.99	S
K	BONUS			K
E	SSDD	\$6.99	—	E
T	DSDD	\$7.50	—	T
T	SKC			T
E	SSDD	\$8.50	\$14.99	E
S	DSDD	\$9.50	\$16.99	S
	DSDD	\$16.99	—	
	VERBATIM			
	SSDD	\$9.99	\$16.99	
	DSDD	\$12.99	\$24.99	

Compare Our Services

- ☆ Access to nation's largest inventory.
- ☆ All merchandise factory fresh
- ☆ Free shipping on prepaid cash orders.
- ☆ Compare our prices.
- ☆ Easy toll free access.
- ☆ Air freight service available.
- ☆ Full accessory line.
- ☆ 24 hr. shipping on in-stock items.
- ☆ Offer C.O.D. with no deposit.
- ☆ Widest selection of name brand products.
- ☆ Full mfg. warranty applies.
- ☆ Courteous and experienced staff.
- ☆ Trained customer service dept.
- ☆ PO's accepted from educational institutions.

DRIVES

GT-64	\$179
INDUS	
BLUE CHIP	
5.25 Drive (C-64)	\$149
128 Drive (C-64)	\$199
COMMODORE	
PC 10-1 Single drive	
(IBM compatible)	\$749
PC 10-2 Dual drive	
(IBM compatible)	\$899
1541C, C1571	CALL

ZENITH

ZVM 1220	89
ZVM 1230	89
ZVM 1240	139
ZVM 1330	385

COMMODORE

1902 Color	289
1802 C	215

THOMSON

365 12 RGB	CALL
Monochrome from	89
HI RES RGB AVAILABLE!	

MONITORS

HITACHI

MM-1218 12" Green	99
MM-1220 12" TTL Amber	129
CM-1216 D 12" RGB	385
CM-1455 S 13" RGB	525
CM-1457 A 13" RGB	679

NEC

Multisync	CALL
-----------	------

TEKNIKA

MJ-22	249
MJ-305 RGB	309
MJ-503	529

PRINCETON GRAPHICS

MAX-12 Amber	175
HV-12 RGB	458
SR-12 RGB	575

PANASONIC

TR-122 MYP 12" Amber TTL	139
TR-122-M9P 12" Green TTL	139

MODEMS

SUPRA

1064	\$49.95
------	---------

COMMODORE

1670	\$129.95
------	----------

AVATEX

1200	\$89.95
1200hc	CALL

CALL TOLL FREE 1-800-233-8760

IN PA 717-494-1030
CUSTOMER SERVICE 717-494-1670

or send to
Lyco Computer
P.O. Box 5088
Jersey Shore, PA
17740



HOURS

Mon-Thur 9 AM-8 PM
Fri 9 AM-6 PM
Sat 10 AM-6 PM

Reader Service No. 137

Risk Free Policy

In-stock items shipped within 24 hrs of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the continental U.S. Volume discounts available. PA residents add sales tax. APO, FPO and international orders add \$5.00 plus 3% for priority mail. Advertised prices show 4% discount for cash, add 4% for Master Card and VISA. Personal checks require 4 weeks clearance before shipping. We cannot guarantee compatibility. We only ship factory fresh merchandise. Ask about UPS Blue and red label shipping. All merchandise carried under manufacturer's warranty. Return restriction applicable. Return authorization required. All items subject to change without notice.



American Challenge: seven courses.
READER SERVICE NO. 132

speed band, wind gauge, and a combination wind, sail, and centerboard indicator provide data needed to maneuver through the race.

The American Challenge comes with a tutorial on audio cassette that guides beginners step by step through the practice course. It's a good trainer, and should be very helpful to first-time sailors. These simplified instructions are also reprinted in the manual for easy reference, along with lots of tips and hints on the basics of sail-

ing. Although it may take several playing sessions to master the techniques well enough to be a champion racer, the tutorial and accompanying manual make this simulation simple to understand and control.

The flip side of the cassette contains an original song written by Tom Snyder and Lincoln Clapp, "Win Back The Cup." It extols the need for America to regain its most famous sailing trophy.

The Official America's Cup Sailing Simulation (Electronic Arts) uses joystick commands to put a 12-meter yacht through its paces in a simulation of the actual 1987 America's Cup Match. The commander chooses the sails, picks a home country, and selects a one- or two-player contest.

In single-player races, the gamer sails the Challenger and the computer controls the Defender. Two-player contests employ separate joysticks for simultaneous control of the rival sailboats. There are three skill lev-

els. They vary weather conditions, the amount of time available for the match, and the skill of the computerized opponent.

A weather report screen provides prerace information about wind speed and wind direction, plus a forecast of what to expect during the actual competition.

Weather conditions are a crucial element of this simulation. Handling a boat on a fair mild day is one thing, but it's an entirely different matter when the wind rises.

Next each captain chooses the starting headsail. Wind direction and speed are the major factors which must be considered. There are light, medium, and heavy genoas and spinakers. The user's manual explains that the weather in the Indian Ocean always produces a wind from the West. In order to sail the first leg, directly into the wind, the manual recommends a light genoa.

The racers contest on a recreation

NEW BASEBALL GAMES IN TOWN

Rating the Rookie Baseball Programs for the Commodore

By Arnie Katz and Bill Kunkel

While the Mets and Red Sox steamrolled to a World Series collision last October, few sports commentaries appeared which didn't invoke the adage, "The game isn't over until the Fat Lady sings." This pithy bit of wisdom from Lawrence Peter "Yogi" Berra is also relevant to the field of computer baseball software.

Just when we think we've seen the last word in baseball programs, new titles burst onto the scene. It looks like the "game" of inventing electronic baseball contests won't be over until that "Fat Lady" sings a dirge over the very last Commodore computer in the universe.

This year continues the trend with offerings from SubLOGIC and Gamestar that will keep America's favorite pastime a computer gaming favorite.



Championship Baseball: well-named.
READER SERVICE NO. 133

Championship Baseball (Gamestar) supplants an earlier Gamestar entry, *Star League Baseball*, as the best action-strategy baseball game on the market. It's fitting that the designer who has dethroned Scott Orr as the Sultan of Sports is...Scott Orr.

Several leading designers have met their Waterloo in the last year or so, putting their names on products



Pure Stat Baseball: most accurate.
READER SERVICE NO. 134

which were definitely inferior to their earlier work. Orr, on the other hand, has scaled new heights in 1986 and 1987. He never pauses for long to bask in the applause. That's probably why he is the mainspring of a string of superlative computer sports games which include *Star League Baseball*, *Star Bowl Football*, *On-Court Tennis*, *Star Rank Boxing*, *GBA*

of the triangular eight-leg Perth course, roughly 24.1 nautical miles in length. The starting line is stretched between a buoy and the Start Boat. At the sound of the first starting cannon, the two boats begin to maneuver into position. A second cannon shot, 30 seconds after the first, signals the start of the race.

The skipper operates the yacht in one of three modes. Helmsman Mode controls the boat's direction of movement. Each twitch of the joystick left (port) or right (starboard) turns the yacht 45 degrees. The player trims the mainsail or changes the headsail in Set Sail Mode. The gamer adjusts the mainsail by moving the main boom in or out with the joystick, and selects new sails by moving the joystick forward (for spinnaker) or back (for genoas), then tapping the button to choose from among three weights.

The Winching Mode lets the sail or lower sails by rotating the joystick counterclockwise, or hoist sails with clockwise rotation. Winching in particular is somewhat tricky. It's easy to give the stick one too many cranks in the wrong direction, and end up with a mess of tangled sails.

Rippling blue water fills the main display. The two colorful boats, one resplendent in yellow and green sails, and the other decked out in red and blue, are attractive and eye-catching.

The gamer views the boats from a three-quarters overhead perspective. If the two boats are too far apart to appear together, the display switch-

Reviewed in this article:

**THE AMERICAN CHALLENGE:
A SAILING SIMULATION**

Mindscape
3444 Dundee Road
Northbrook, IL 60062
Phone: 312-480-7667
Price: \$29.95

**THE OFFICIAL AMERICA'S CUP
SAILING SIMULATION**

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Phone: 415-571-7171
Price: \$32.95

es to a split screen. However, the commander can always call for an overview to show their relative positions on the course.

A separate indicator panel for each boat appears in the lower corners of the screen. Each gives boat and wind speed, elapsed time, buoy, yacht and wind direction, and the number of the current leg of the race.

The official cup simulation is a best-of-seven match. During the contest, International Yacht Racing rules apply. The program punishes any infraction of these laws with a penalty of four boat lengths.

Following each race, a Results Screen lists the race number, winning yacht, and time. The captain then either starts the next race, continuing the seven-match series, or begins a new series.

There's quite a lot to do to keep a craft in the contest. Weather conditions change constantly, so the sails must be adjusted to match. The indicator panels keep both captains apprised of changes, and the appearance of the water also varies to reflect wind velocity. Rounding buoys generally requires a change of sails; this complex maneuver is so important to racing that the manual advises gamers to practice it repeatedly.

The documentation is an information-packed booklet that contains all the data needed to control the yachts, plus a wealth of material about the America's Cup Race and its history. A glossary explains nautical terms, and should have computerists talking like sailors in no time.

This is a challenging simulation. The joystick commands, nicely capsulized on a quick-start card for easy reference, are complicated. Once the computerist masters the control scheme and gets the hang of changing sails to match weather and sailing conditions, the race itself is strenuous and exciting. The computerized opponent, particularly at the top skill setting, is an able seafarer.

Both simulations have their strengths, differing chiefly in the depth of detail. *The Official America's Cup Sailing Simulation* is more complex, but it is also somewhat more exciting than *The American Challenge*. Either should provide hours of nautical entertainment even for those who can't tell a mainsail from a mainframe. —Joyce Worley

Basketball, GFL Football, and now Championship Baseball.

This one- or two-player program embellishes and extends the concepts introduced in *Star League Baseball*. In particular, Orr and his cohorts, under the steady hand of producer Mark Madland, have worked wonders with artificial intelligence.

Unlike primitive, arcade-style programs, the players are more than nicely drawn onscreen cursors. Each player's ability to bat, catch, throw, and run is rated on a one-to-three scale. *Championship Baseball* also

divides players into contact hitters (liners) and power hitters (sluggers). Pitchers are also differentiated. The game rates them in three categories: speed, control, and stamina. Each has an arsenal of four different deliveries, and some display a sharper curve or a more overwhelming fastball than the norm.

Participants see the diamond from an upper deck perspective with home plate at the left edge of the screen. The players are a little cartoonish, but the animation is quite good.

The secondary display, which fills

the right half of the screen during pitcher-batter confrontations, adds a lot of excitement to this crucial phase of the game. Managers view each pitch from the catcher's crouch behind home. The player at bat must time the pitch and, if it is in the strike zone, swing at the right moment to put the horsehide into play.

The joystick initiates all on-the-field action, whether the game is played against another human manager or the talented robot coach. Options are chosen by moving a cursor to select items from menus, while

game mechanics utilize a fairly simple set of stick and action button combinations. Those who become all thumbs when faced with anything more complex than a move and fire play-mechanic will appreciate the practice mode, which is also good for perfecting a fence-busting swing.

Two well-balanced squads, the Eagles and the Pumas, are included on the game disk, but *Championship Baseball* provides a menu-driven system to create an entirely new team from scratch. If the user picks the "New Team" option, the program presents the possible choices at each position. The manager can tailor the team to suit personal preference by selecting men who excel in the areas he or she deems most important.

Championship Baseball even allows managers to name each player! For the first time, any computerist can star in center field or shell the analog of a boss or teacher from the mound with heavy hitting. These customized squads can be saved on a formatted disk. Unfortunately, there is no initialization routine included on the game disk, so computerists will have to use the slightly more cumbersome method explained in the Commodore documentation.

League play, only possible in the solitaire mode, extends the simulation beyond a single contest. After the computerist picks a team and division, his franchise will play one of the five other clubs in the division. When the computerist's team has played each of its divisional rivals once, a winner is declared. If the human-directed team finishes first, the computer matches it against the winner of one of the other divisions. A victory at this level advances the team to the best-of-three Championship.

The program stores the results of games for the season in progress on a blank formatted disk. A sports page, *The Gamestar Gazette*, shows the current standings.

Championship Baseball is a worthy successor to the classic *Star League Baseball*. It is so much of an improvement, in fact, that avid fans of the classic game will want to update

their software libraries with the new one.

Despite its strengths, *Pure-Stat Baseball* (SubLOGIC) may be destined to play Avis to *Micro League Baseball's* Hertz among statistical baseball simulations for the Commodore 64/128. The Quest design team has developed many innovative features, but deficiencies in graphics and somewhat pedestrian gameplay undercut the overall effect.

Pure-Stat clearly leads the computer baseball league in statistical accuracy. No program produces more realistic results in a one-game, series, or season replay. It treats most phases of the sport much more comprehensively than other such programs.

Reviewed in this article:

CHAMPIONSHIP BASEBALL

Gamestar/Activision
2350 Bayshore Parkway
Mountain View, CA 94043
Phone: 415-960-0410
Price: \$34.95

PURE-STAT BASEBALL

SubLOGIC Corporation
713 Edgebrook Drive
Champaign, IL 61820
Phone: 217-359-8482
Price: \$49.95

No hardball simulation weighs more factors to compute play results. Instead of a single, all-purpose fielding ratio, *Pure-Stat* employs separate ratings to measure each athlete's arm strength, range, and tendency to commit errors. This improves realism and provides managers with a legitimate reason to make defensive changes. For example, it might make sense to insert a strong-armed outfielder to reduce the chance that a runner will tag up and score a key run after a long fly out.

An important component of the hitting phase is that each batsman is rated separately for his ability against lefthanded and righthanded hurlers. This is not just a minor factor grafted onto the basic to-hit chance, either. *Pure-Stat* provides what amounts to two separate batting formulas for

each player. Other elements which the program considers include pitcher fatigue, bunting ability, and the impact of park dimensions on player and team performance.

The main display is the statistics screen, not the diamond. This reflects the fundamental design approach which subordinates the audiovisual effects to the demands of creating a rich statistical model of major league baseball.

After the managers enter offensive and defensive orders, the view automatically switches to the field for a visual representation of the result. Since the stat-screen has all the pertinent numbers and command menus, the graphic screen is unmarred by distracting text windows.

The program tracks each play on one of two full-screen diamonds as it unfolds. When a lefthanded hitter is at bat, home plate is in the lower right corner with the third base foul line parallel to the bottom of the screen. With a righty at the plate, home is in the lower left corner and the first base foul line runs along the lower border of the screen.

No one could quarrel with the quantity of visuals in *Pure-Stat Baseball*, but quality is another matter. The simply drawn fielders are well-animated, but they sometimes move in odd-looking lockstep patterns. For instance, it's hard to suppress a smile when all three outfielders form a chorus line to chase after potential extra-base hits.

Some expected graphics are inexplicably omitted. For instance, there is no visual representation of a bunt attempt. Hitters look like they're swinging from the heels, even when a bunt attempt is in progress.

Ball action is uneven. A post-publication upgrade introduced a rounder and more lively ball, but it still behaves unrealistically at times. It is not unusual to see the center fielder snare what appeared to be a drive down the line.

Participants use a joystick or the keyboard to enter orders. First the pilot of the team at bat decides whether the batter will go for the fences,

swing normally, hit cautiously, bunt, sacrifice, or slap the ball behind a runner. Next comes decisions related to the running phase.

Besides the steal option, a manager can order men on base to challenge the other team's outfield arms or play it safe. This is one of the small but telling details which make *Pure-Stat Baseball* so rewarding for diamond strategists. Other programs let the offense set an overall running tendency, but only *Pure-Stat* presents the situation so exhaustively. For the first time, both managers must independently evaluate each outfielder's throwing ability.

Managers shape the pitching only in the most general way. The skipper decides whether to throw aggressively, avoid giving the batter anything juicy to hit, issue an intentional walk, or attack the runner with a pitchout. The battery determines actual pitch selection.

Finally, the manager positions the infielders and outfielders. The defensive team can draw in the infield all around to cut down a potential run, have the first and third basemen charge toward home, or guard the foul lines to prevent extra-base hits. In practice, managers have little to do unless runners are in scoring position. This makes *Pure-Stat Baseball* better for solitaire play than for head-to-head gaming.

Fortunately, the robot manager is quite formidable. It can't equal the savvy of a human coach, but it makes most of the proper decisions, including adroit use of platooning.

A set of "quick play" options takes most of the tedium out of ambitious season replays and other marathon undertakings. The computerist can personally replay the games and series he or she finds most interesting, and zip through the less appealing contests. It is possible to switch off the graphic display, eliminate timing delays, establish pitching rotations for both clubs, and have the computer simulate up to nine games in a few minutes each.

This is a complete package. Included with the basic game are eight all-

time great teams of the past, a choice of three stadiums, a statistical compiler, a utility for trading players between teams and creating new ones from scratch, and a disk with teams based on the most recent major league baseball season.

There's no question that *Pure-Stat Baseball* sacrifices some frills to devote memory to its comprehensive mathematical model. Those baseball gamers who demand state-of-the-art

statistical verisimilitude for season and series replays should enjoy *Pure-Stat Baseball*.

Are these the last new baseball programs for the Commodore 64/128? It's hard to see how publishers could improve on games like *Championship Baseball*, *Micro League*, *Hardball*, and *Pure-Stat*. Yet based on events of the last couple of years, we may have to eat these words in next April's *Ahoy!* —**Arnie Katz & Bill Kunkel**

HOWARD THE DUCK

Activision

Commodore 64/128

Disk; \$34.95

An article in February's *Ahoy!* discussed the boom in games based on licenses, especially those derived from movies and television. This title provides an example of one of the pitfalls which can snare the unlucky software publisher.

When Activision bought this license, it believed "Howard the Duck" would be one of 1986's biggest movie box office successes. Unfortunately, the film never took wing. Except for *People Magazine*, which was so im-



Run afield of the deranged Dark Overlord.
READER SERVICE NO. 106

pressed with the film's estimated \$35 million loss that it put Howard on its latest list of most intriguing "people," "Howard the Duck" was a non-event.

COPY II[®] 64/128


BACKUP PROTECTED SOFTWARE FAST.

From the team who brought you Copy II Plus (Apple), Copy II PC (IBM) and Copy II Mac (Macintosh) comes a revolutionary new copy program for the Commodore 64/128 computers.

- Copies many protected programs — automatically. (We update Copy II 64/128 regularly to handle new protections; you as a registered owner may update at any time for \$15 plus \$3 s/h.)
- Copies even protected disks in under 2 minutes (single drive).
- Copies even protected disks in under 1 minute (dual drive).
- Maximum of four disk swaps on a single drive.

- Includes fast loader, 12-second format.

Requires a Commodore 64 or 128 computer with one or two 1541 or 1571 drives.

Call 503/244-5782, M—F, 8—5 (West Coast time) with your  in hand. Or send a check for \$39.95 U.S. plus \$3 s/h, \$8 overseas.

\$39.95

Central Point Software, Inc.
9700 S.W. Capitol Hwy. #100
Portland, OR 97219

Central Point
Software
INCORPORATED

Backup utilities also available for the IBM, Apple II, Macintosh and Atari ST.
This product is provided for the purpose of enabling you to make archival copies only.

It would be regrettable if the failure of the film automatically doomed the game. *Howard the Duck* isn't likely to haul away many software awards, but it's pretty entertaining, especially for younger computerists.

The designers and programmers of a string of Gamestar sports hits like *Star Rank Boxing* and *Championship Baseball* have ventured into new waters. While the program, like the movie, fails to completely capture the essence of the fearless fowl created by Steve Gerber for Marvel Comics, it is, at minimum, a playable action-strategy contest.

The lengthy introduction establishes the lighthearted tone. After the credits roll, Howard demonstrates his breakdancing skill. Once he moonwalks off the stage, a pair of cartoon panels indicate that Howard is worried about Beverly and Phil, his two missing companions.

Where have they gone? The synopsis

which crawls up the screen dispels the mystery for the player, if not for the dauntless duck. A new Dark Overlord has kidnapped them as bait to lure Howard to his doom. Because the would-be conqueror plans to use thermal power in his mad scheme, he has taken the pair to his base, Volcano Island.

The gamer can choose from among four skill settings. The higher the level, the more involved the quest. The "novice" game requires Howard to parachute onto the island, find a jet pack, and skim over the water to a trail which leads through the jungle to a waiting ultralite plane.

An "intermediate" player must fly the ultralite to the top of the volcano. The most difficult variants require Howard to fly into the crater, overcome the Dark Overlord, and throw the switch which halts the threatening eruption.

Hostile mutants erupt from the yellow mounds which dot the route. They are Howard's biggest opposition, other than the Dark Overlord himself. The feathered hero can nip this peril in the bud by stomping the mounds closed before the mutants emerge or by using "quack fu" to defeat them in direct combat. The computerist makes Howard kick by holding down the action button and pointing the stick. Leaving the button in the "up" position initiates a punch.

In keeping with the subject matter, this program is easy enough for even preteens to learn and play. It's not a snap by any means, but there's nothing in *Howard the Duck* to frustrate apprentice joystick jockeys. Even adults should get a kick out of the superb animation. Its little comedic touches, such as the way Howard shakes himself after getting wet, are certain to draw appreciative smiles. *Howard the Duck* also features excellent music, programmed by sound ace Russell Lieblich.

Continuous action and an onscreen countdown clock maintain a reasonable level of excitement. So skip the movie and apply the cost of the tickets and popcorn to this unassuming, enjoyable Activision entry.

Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043 (phone: 415-960-0410). —*Arnie Katz*

TITANIC: THE RECOVERY MISSION

Electric Dreams/Activision

Commodore 64/128

Disk; \$29.95

The R.M.S. Titanic has been subject of at least two films, scores of books, and numerous underwater diving expeditions. The celebrated sea disaster in which an "unsinkable" liner went to the bottom remains fascinating to this day. Now a game has also sprung from the continuing interest in the ill-fated ocean liner.



A quest titanic enough to span weeks.
READER SERVICE NO. 107

This British-conceived outing, released here by Electric Dreams (one of the many Activision affiliates) offers pleasant surprises in the quality of the game and the depth of the challenge. Put simply, the test is to grab treasures from the wreckage and then float her to the surface.

Less imaginative designers might have handled *Titanic* as an arcade program in which the gamer would fight off sharks, jellyfish, and the like while trying to raise the ship from the briny deep. But *Titanic: The Recovery Mission* makes the actual raising of the ship a small part of the overall challenge, even though it remains the game's ultimate goal.

As Dr. Robert Ballard of the Woods Hole Oceanographic Institute must have found when he visited the

CAR
EDUCATION
BUSINESS
ENTERTAINMENT
EXCLUSIVE OFFERS
EXCLUSIVE PRICES
DISCOUNTS
BONUS COUPONS
CATALOGS & NEWSLETTERS
TOLL FREE ORDER LINE
DISCOUNTS
LATEST RELEASES
BUSINESS RELATIONS
LATEST RELEASES
BONUS COUPONS
CATALOGS & NEWSLETTERS
TOLL FREE ORDER LINE

DISK-OF-THE-MONTH CLUB
GUARANTEES
LOWEST PRICES
YOUR SUPERMARKET
TO GREAT
SOFTWARE VALUES

ORDER LINES
800-345-CLUB
201-794-3220

SEND FOR
DETAILS



NO OBLIGATION

DISK-OF-THE-MONTH CLUB

P.O. BOX 116, FAIR LAWN, N.J. 07410-0116

NAME _____

STREET ADDRESS _____

CITY _____

STATE _____

ZIP _____

Div. of UNLIMITED SOFTWARE INC

Reader Service No. 153



Press conferences are an enjoyable and important aspect of Titanic.

site of the wreckage a couple of years ago, it takes more than skillful divers and courage to accomplish this task. There are several other considerations. *Titanic* covers these by using multiple game screens.

The first of these displays is the Calendar Screen. Visible when the game boots, it is the pathway to all the other options. It shows the starting date of the mission along with a set of five icons, doorways to the Finance Room, the Diver, the Press Room, and Night Time. The disk-shaped fifth icon is used to save a current game or load an old one. (The "save" feature is vital, since solving this game at one sitting would be like building Rome in a day.)

Let's take the screens one by one. The Finance Room is the area to check on the financial backing of your trip. It is also the place to communicate with the people who supply money for the venture. The money isn't available all at once. Rather, it is handed out in weekly doses. How much is given depends upon how the mission is going.

The Finance Room can be entered voluntarily to check the books or to ask sponsors for more money, but the sponsors can also call the gamer back to the room to answer questions about the adventure. Ignoring these requests, even if busy exploring the depths of the wreckage, can dry up funds quicker than water in the desert.

The Press Room plays a very important part in keeping finances in the black. Press conferences, called by the gamer or by members of the news media, are one of the more enjoyable aspects of the game. The reporters appear on small television screens. The player must decide whether to

direct the answer to just that reporter or to the group as a whole. The user picks the specific reply from a list of possible answers.

Good press is vital for the continued contributions of sponsors. Therefore, it's advisable to remain at the conference until all questions have been answered. Keep in mind the publication connected with each reporter and try to tailor the answers to that audience.

Then it's time to go underwater. The *Titanic Salvage I*, now called T.S.I., is the destination when the Diver icon is selected. The wreckage can be entered from any one of five points. The joystick controls the movement of the T.S.I.

The console of the T.S.I. is the most impressive screen. It feels like the whole world is available at the touch of a button. Some of the many controls include floor/ceiling passage indicators (to move up and down levels within the ship), sonar screen (to keep track of sonar buoys laid down to aid in location of T.S.I. within wreckage), camera and camera film indicators (don't forget to take pictures of some treasures to keep the boys in the press happy), and the robot arm (used to collect treasures).

Every feature is logically arranged and beautifully depicted. In all, the game is graphically superior to the other Electric Dreams products (i.e., *Rocky Horror* and *Spindizzy*).

After a hard day of diving, begging for money, and dealing with the media, a good night's rest is deserved and needed. That's the time to use the Night icon. It's also a good idea to save the game's progress. This is handy to do right after the program loads, since it isn't possible to restart the program without rebooting.

Titanic, which could take simulated months to finish, obviously isn't carried out in real time. The clock runs about eight times faster than real time. The captain of the mother ship must return to port every two weeks, for fresh supplies and to give the crew time off whether you like it or not.

In actuality, there is no time limit. As long as there's still money com-

Free Spirit Software, Inc.

538 S. Edgewood
La Grange, IL 60525
(312) 352-7323

1541/1571 DRIVE ALIGNMENT

Avoid costly repair bills! Perform your own alignment. 1541/1571 Drive Alignment diagnoses and reports the alignment condition of the disk drive as you perform adjustments. An on-screen HELP menu is available while the program is running. Full documentation includes section on how to load Alignment program even when the drive is badly misaligned. Auto-boots to all modes. Works on 1541, 1571 in 1541 or 1571 mode, C64 or C128 in 64 or 128 mode. Only \$34.95!

SUPER DISK LIBRARIAN

A full featured disk cataloging and library system for the C128 in 128 mode. With one keypress all programs on a disk are cataloged. Catalog up to 1000 disks and 15,200 program names! Operates in fast mode with 80 column display. Catalogs 1541, 1571 and CP/M Plus formatted disk directories. Reads heavily protected disks! Printer output includes library index, full library report, master program list, category program list and disk labels. Also contains full featured disk utilities section including all CBM DOS commands plus rename a disk, copy protect a disk, change disk format without affecting data & much more! Fully documented. Organize your disk library & more for only \$29.95!

MUSIC OF THE MASTERS

Free Spirit's highly acclaimed Music of the Masters series is a must for all music lovers. An hour of classical music per disk for the C64 or the C128 in 64 mode.

Music of the Masters I - Handel, Haydn, Mozart, Bach, Beethoven & many others!

Music of the Masters II - Minuets, waltzes, sonatas & more from Bach, Brahms, Beethoven, Chopin, Schubert & many others.

Music of the Masters III - Mostly Mozart.

Music of the Masters IV - Best of Bach.

Music of the Masters V - Popular themes from the greatest & best known works of the Masters. \$9.95 per disk, 2 for \$17.95, 3 for \$24.95, 4 for \$31.95, order all 5 disks for only \$38.95!

The Great War - WWI strategy game for the C128 in 128 mode and 1571 disk drive. Armies of 17 countries represented. Hundreds of hours of challenge. Disk - \$29.95

BASICally Simple 64 - How to use all basic 2.0 commands in Basic programs. Disk - \$14.95

BASICally Simple 128 - How to use all Basic 7.0 commands in Basic programs. Disk - \$19.95

Programmer's Notebook - High speed storage & retrieval system designed specifically for the programmer. Index magazine articles, programming routines or other computer related information. For the C128 in 128 mode. Disk - \$19.95

Mr. Quizzer - Program to prepare quizzes as a general aid to learning. Prepare multiple choice, vocabulary, spelling, T-F, or general question-answer tests. Works on C64, C128 in either 64 or 128 mode, 40 or 80 column display, 1541 or 1571 disk drive, Commodore & compatible printers. Disk - \$19.95

Free shipping & handling! Immediate delivery! Illinois residents add 8% sales tax. Send check or money order to:

Free Spirit Software, Inc.
538 S. Edgewood
La Grange, IL 60525

ing in, take as much time as you'd like uncovering this mystery of the deep. You'll run out of funds before you tire of this intriguing entertainment.

Activision, 2350 Bayshore Frontage Parkway, Mountain View, CA 94043 (phone: 415-960-0410).

—Rick Teverbaugh

VIDEO VEGAS

Baudville

Commodore 64/128

Disk; \$29.95

Ah, the lure of the big, bright lights! The noise, the excitement, the shows, the showgirls, and gambling keep things humming from Monte Carlo to Las Vegas. Wagering on games of chance is old as the Bible.

Video Vegas doesn't exactly create all the thrills of visiting the world's opulent pleasure palaces, but it does an admirable job of doing just what the packaging says it will: "Turn your personal computer into a casino."

Chance-takers can choose from among four different games: slot machine, blackjack, draw poker, and



Video Vegas slot machine craps out.
READER SERVICE NO. 136

keno. The take is \$1,000 when the game boots. The amount won or lost at each game is carried over to the next choice. If the total tumbles all the way down to zero, rebooting is the remedy, instead of a second mortgage on the house or a visit to loan sharks.

The *Video Vegas* box also advertises that the odds for each game are given and that they are adjustable. These statements are both true to varying degrees. A single keystroke is all that's needed to see the odds for any particular game. To adjust the odds (probably more in your favor), it is necessary to tinker with the source code. Unfortunately, this process is not covered by the game's documentation.

The opening screen is a close-up of the Vegas Strip with cars moving swiftly up one side and down the other. A tap of the spacebar (the game makes no use of the joystick) changes to the option screen for selection of your particular poison.

Easily the most lackluster of the four games is the slot machine. The only strategy here is to try to bet big when you're going to win and small when you're not. But that's a guessing process at best.

A closeup of the machine dominates the screen. All that's left to do is decide whether to risk one, two, or three dollars by tapping the "1", "2", or "3" key. Then sit back and wait for the handle to be pulled and the three tumblers to come to a stop.

The "?" key gives the odds and payoffs for each combination, and F1 reverts back to the scene on the Strip.

Keno isn't much better. Since that game isn't as widely known, a run-down of the rules might be in order.

There are 80 numbers on a board from which the gamer chooses up to 15. Then 20 numbers are selected at random. It's necessary to hit more than half the picked numbers to get a payoff of any kind. As with any lottery, the strategy is minimal.

Keno's odds are very long, but the payoffs are huge. Hitting eight numbers produces \$20,000 on a \$1 bet. Too bad the odds against getting all eight are 200,000 to 1.

Poker is only marginally more satisfying. Play is against a fixed set of odds and a fixed payoff, much like the poker video machines which are popular in many arcades and bars. There is no dealer or other player.

It takes a pair of jacks or better to get the bet back. On a \$5 bet, two pair wins \$10, three of a kind pays \$15, and so on up the ladder. Most traditional poker rules apply.

Really, the guts of this program is blackjack. While the other games are handled in a page or less of the documentation, it takes four and a half pages to cover blackjack.

Options are plentiful. It is possible to use from one to four decks for the deal. The more decks, the more difficult card counting becomes. As a tutorial for card counting, a practice banned at most casinos, *Video Vegas* isn't bad. The game has a built-in aid to help keep track of what cards have been played, and the documentation explains briefly two forms of card counting.

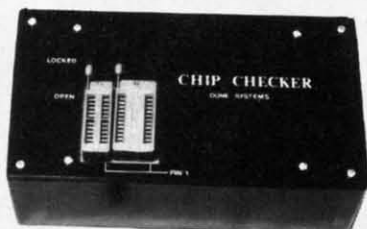
It is possible to split any hand with a pair, and doubling is also an option when one more card just might do the trick. Insurance against a dealer's upturned ace can be called at the touch of a key, but only expert card counters really benefit. It cuts losses and protects against a natural 21, but it'll never make a winner out of a losing hand.

In all, *Video Vegas* is a pleasant diversion. The program would have had more bite if it had also included some form of craps as a fifth game or in place of keno or the slot machine.

Baudville, 1001 Medical Park Drive S.E., Grand Rapids, MI 49506 (phone: 616-957-3036).

—Rick Teverbaugh

CHIP CHECKER



TESTS and/or IDENTIFIES

- Over 600 Digital ICs
- 74/54 TTL + CMOS
- 14/4 CMOS
- 9000 TTL
- 8000 National and Signetics
- 12-24 Pin Chips (.3" + .6" widths)

Pressing a single key identifies/tests chips with ANY type of output in seconds. Inexpensive software updates will be offered as new chip tests are developed. The CHIP CHECKER is available for the Commodore C64 and C128 for only \$159.

DUNE SYSTEMS

2603 Willa Drive
St. Joseph, MI 49085
(616) 983-2352

Reader Service No. 136

IF YOU NEED \$5,000...\$20,000 EVEN UP TO \$500,000 TO START A NEW BUSINESS OR TO EXPAND AN EXISTING FIRM—THEN READ WHY YOU TOO WILL CALL THIS INCREDIBLE MONEY RAISING

BUSINESS OPPORTUNITY SEEKERS' LOANS MANUAL

"The Small Business Borrower's Bible"

Practically prepares the loan application for you line-by-line...the "proper" way.

All properly prepared applications are processed faster...no red tape!

EVERY
LOAN DOLLAR
YOU GET
YOU KEEP
AND USE TO
OPERATE
YOUR BUSINESS

Guaranteed Loans...Direct Loans...and Immediate Loans are available now!

Most men and women seriously interested in starting their own business are eligible to apply — including those who already own a business and need capital fast for expansion...or to stay afloat...even if they've been flatly refused by banks and turned down elsewhere! Yet, too many never qualify, simply because they do not know how to "properly" prepare the loan application...

In order to help those people applying for these guaranteed and direct loans fill out their loan applications the "right way" our business researchers, with their diligent compilation and effective efforts, have successfully assembled and published a comprehensive, easy-to-follow seminar manual: The Business Opportunity Seekers' Loans Manual, that will quickly show you practically everything you'll need to know to prepare a loan application to get federally Guaranteed and Direct Loans.

Here are just some of the many important benefits the Business Opportunity Seekers' Loans Manual provides you with:

- a completely filled in sample set of actual SBA loan application forms, all properly filled in for you to easily follow—helps you in quickly preparing your own loan application the right way. Each line on the sample application forms is explained and illustrated in easy-to-understand language.
- fast application preparation procedures for getting loans for both new start up business ventures and established firms.
- advises you on how to properly answer key questions necessary for loan approval and in order to help avoid having your application turned down—gives you advice on what you should not do under any circumstances.
- what simple steps you take to guarantee eligibility—no matter if you do not presently qualify.
- where you can file your application for fastest processing.

At this point the most important question you want answered is: Just where is all this loan money coming from? Incredible as it may sound—these Guaranteed Loans,

Direct Loans, and Immediate Loans are indeed available right now — from the best, and yet, the most overlooked and frequently the most ignored and sometimes outright ridiculed "made-run-of" source of ready money fast capital in America — THE UNITED STATES GOVERNMENT.

Of course, there are those who upon hearing the words "UNITED STATES GOVERNMENT" will instantly freeze up and frown and say:

"...only minorities can get small business loan money from the government!"

Yet on the other hand (and most puzzling) others will rant on and on and that:

"...don't even try, it's just impossible — all those Business Loans Programs are strictly for the Chryslers, the Lockheeds, the big corporations, not for the little guy or small companies" etc.

Still there are those who declare:

"...I need money right now...and small business government loans take too darn long. It's impossible to qualify. No one ever gets one of those loans."

Or you may hear these comments:

"...My accountant's junior assistant says he thinks it might be a waste of my time!" "Heck, there's too much worrisome paperwork and red tape to wade through."

Frankly — such rantings and ravings are just a lot of "bull" without any real basis — and only serve to clearly show that lack of knowledge...misinformation...and not quite fully understanding the UNITED STATES GOVERNMENT'S Small Business Administration's (SBA) Programs have unfortunately caused a lot of people to ignore what is without a doubt — not only the most important and generous source of financing for new business start ups and existing business expansions in this country — but of the entire world!

Now that you've heard the "bull" about the United States Government's SBA Loan Program — take a few more moments and read the following facts:

- Only 9.6% of approved loans were actually made to minorities last year.
- What SBA recognizes as a "small business" actually applies to 97% of all the companies in the nation.
- Red tape comes about only when the loan application is sent back due to applicant not providing the requested information...or providing the wrong information.
- The SBA is required by Congress to provide a minimum dollar amount in business loans each fiscal year in order to fully comply with strict quotas. (Almost 5 billion this year)

Yet, despite the millions who miss out — there are still literally thousands of ambitious men and women nationwide who are properly applying — being approved — and obtaining sufficient funds to either start a new business, a franchise, or buy out or expand an existing one. Mostly, they are all just typical Americans with no fancy titles, who used essentially the same effective know-how to fill out their applications that you'll find in the Business Opportunity Seekers' Loans Manual.

So don't you dare be shy about applying for and accepting these guaranteed and direct government loans. Curiously enough, the government is actually very much

- **GUARANTEE #1**
Simply — look over this most effective money raising loan preparation assistance manual for 15 days — and then, if you are not convinced that it can actually help you obtain the Business Loan you need right away — just return it for a full and prompt refund.

interested in helping you start a business that will make a lot of money. It's to their advantage — the more money you make the more they stand to collect in taxes. In fiscal 1986, our nation's good old generous "uncle" will either lend directly or guarantee billions of dollars in loan requests, along with technical assistance and even sales procurement assistance. Remember, if you don't apply for these available SBA funds somebody else certainly will.

Don't lose out — now is the best time to place your order for this comprehensive manual. It is not sold in stores. Available only by mail through this ad, directly from Financial Freedom Co., the exclusive publisher, at just a small fraction of what it would cost for the services of a private loan advisor or to attend a seminar. For example:

Initially, this amazing Guaranteed and Direct Loans Manual was specially designed to be the basis of a Small Business Loan Seminar — where each registrant would pay an admission fee of \$450. But our company felt that since the manual's quality instructions were so exceptionally crystal-clear that anyone who could read could successfully use its techniques without having to attend a seminar or pay for costly private loan advisory assistance services.

Therefore, for those purchasing the manual by mail, no 3 day class, no course and accommodations are required. And rather than \$450 we could slash the price all the way down to just a mere \$20 — a small portion of a typical seminar attendance fee — providing you promptly fill in and mail coupon below with fee while this special "seminar-in-print" manual offer is still available by mail at this relatively low price!

Remember, this most unique manual quickly provides you with actual sample copies of SBA Loan application and all other required forms—already properly filled in for you to easily use as reliably accurate step-by-step guides—thus offering you complete assurance that your application will be properly prepared and thereby immediately putting you on the right road to obtaining fast no red-tape loan approval.

- **GUARANTEE #2**
Even after 15 days — here's how you are still strongly protected — if you decide to keep the manual — and you apply for an SBA Loan anytime within 1 year — your loan must be approved and you must actually receive the funds or your money will be refunded in full.

Only because we are so confident that this is a fact do we dare make such a strong binding seldom-heard-of Double Guarantee. No stronger guarantee possible!

Of course, no one can guarantee that every request will be approved—but clearly we are firmly convinced that any sound business request, properly prepared—showing a reasonable chance of repayment and submitted to SBA—will be approved.

THOUSANDS ARE PROPERLY APPLYING AND BEING APPROVED. HERE'S YOUR CHANCE TO JOIN THEM!

FREE BONUS

If you order your manual today you'll receive a valuable treasury of fast, easy, low capital and highly profitable business programs worth forty-five dollars — yours absolutely free!

100% tax deductible as a business expense. Don't delay — order your copy today!

NO RISK LOAN OPPORTUNITY FORM

Detach and rush for COMPLETE PREPARATION ASSISTANCE FOR LOAN APPROVAL

Please rush me _____ copies of "Business Opportunity Seekers' Loans Manual" each at a \$20 fee plus \$3.00 handling and shipping.

I am fully protected by the two strong guarantees above. I'm ordering today — so I can receive FREE — the valuable treasury of fast, easy, low-capital and highly profitable business programs — worth forty-five dollars — mine free to keep even if I decide to return the manual for a full refund.

☐ Enclosed is Full Payment
☐ Cash ☐ Check ☐ Money Order
Send payment with order.

Name _____

Please Print Clearly

Address _____

City _____

State _____ Zip _____

MAIL TO:

Financial Freedom Publishers
110 W. 5th St. Dept. AM-2
Winston-Salem, NC 27101

ORDER NOW

©1985 Reader Service No. 118

GUARANTEED YOUR LOAN MUST BE APPROVED...OR MONEY BACK — ONLY A SMALL PRICE TO PAY FOR THE LOAN YOU CAN GET...NO RISK AND NO HASSLES.

BUSINESS OPPORTUNITY SEEKERS' LOANS MANUAL

VALUE-SOFT

9513 S.W. Barbur Blvd. M-56

Portland, Oregon 97219

Dealers & Schools Welcome



For ORDERS only

1-800-544-SOFT

Oregon call 1-503-246-0924

Add \$2.00 S. & H. Visa/MC gladly

L'Bow™

CARTRIDGE PORT CONVERTER
CONTINUED DESIGNED FOR
COMMODORE 64 & 128 COMPUTERS



\$19.95

- BUILT-IN "WARM RESET" BUTTON WILL ELIMINATE TURNING POWER OFF/ON TO RESET
- PARALLEL EXPANSION PORT ON L'BOW'S BACKSIDE ALLOWS SIMULTANEOUS HARDWARE & SOFTWARE ACCESS.
- VERTICAL CARTRIDGE PORT MAKES CARTRIDGE USE MUCH EASIER.

• NO MORE STRESS ON THE COMPUTER'S PRINTED CIRCUIT BOARD FROM THE PRESSURE OF PLUGGING IN CARTRIDGES SINCE L'BOW PUTS IT ALL ON THE TABLE TOP.

DISK DOUBLER

CUTS A PRECISION SQUARE NOTCH IN THE DISKETTE AT EXACTLY THE RIGHT SPOT SO THE "FLIPSIDE" CAN BE USED.



\$6.95

C-64 POWER SUPPLY

\$29.95

CABLES ETC.

6 Ft. 6 pin, male both ends	# B66	\$6.95
9 Ft. 6 pin, male both ends	# B69	\$8.95
18 Ft. 6 pin, male both ends	# C618	\$16.95
6 Ft. 6 pin, male/female	# A66	\$6.95
9 Ft. 6 pin, male R-ang/male	# R69	\$9.95
6 Ft. Monitor, 5 pin/4 RCA	# D56	\$9.95
6 Ft. Monitor exten., 5 pin	# E56	\$6.95
6 Ft. Centronics, male/male	# C6MM	\$14.95
6 Ft. Cent., male/female	# C6MF	\$14.95
6 Ft. RS-232, male/male	# G625	\$14.95
100 write protect tabs	# TAB	\$1.49
100 Tyvek disk sleeves	# DS	\$5.95
6 jewelers screw drive set	# SC6	\$4.95

PROTECTION REVEALED

NOW \$15.95

A beginners guide to software protection. Become a master of illusion. Book is 141 pages, free disk of 21 utilities included



REFERENCE BOOK

\$15.95

The best friend a C128 owner ever had. Includes C64, 128, CPM 3.0, 1541, & 1571 drives 261 pages, 75 easy charts & tables. Think of Black Book as a dictionary, always ready to answer your questions.

BEGINNER'S PAK 64

\$15.95

- 1.150 popular subroutines on disk, add to your own programs, graphics, sorts, etc.
 - 2.poster (21x28) screen/color memory map.
 - 3.extensive C64 memory map
 - 4.18 bound cheat cards, commands at hand
- All four items in one great package price

CARTRIDGE PORT CABLE

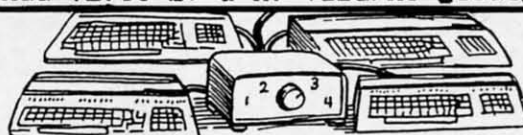
\$19.95

10 in. extension cable for cartridge port

APROSPAND-64

\$29.95

4 slot switchable expansion board, plus a reset button/fuse protection. Plugs into cartridge port, has 4 switchable (singly or any combination) expansion connectors. Gives your C64 or 128 full expandability. This is superbly designed unit.



\$ SAVER SWITCH

\$29.95

Vic-20, C16, Plus 4, C64, C128, AB switch 2 computers to 1 drive and printer or two printers to 1 computer. 3 female sockets, plugs in in seconds.

SUPER SAVER 4

\$79.95

4 Commodore computers to 1 drive/printer, great for schools or business.

MONITOR SWITCH

\$39.95

Share 1 monitor with 2 computers, change output at the turn of a knob. The box has 2, 5 pin cables, 1 to each computer, plus a 8 pin socket for the monitor. C64/C128

CENTRONICS AB SWITCH

\$39.95

All 36 pins switched, female connectors, gold pins, high quality push button.

CENTRONICS ABCD SWITCH

\$59.95

All features of the AB except 4 computers to one device. Rotary switch.

RS 232 AB SWITCH

\$39.95

All 25 pins switched, female connectors, gold pins, high quality push button.

128 CABLE 40/80 column

\$9.95

80 columns with the 1701/1702 monitors.

128 40/80 switchable cable

\$21.95

80 columns, plus built-in switch

POWER CENTER

\$59.95

EMI filtering, 15 AMP breaker, surge protection, lighted rocker switches, heavy all metal case. \$5.00 shipping this item only

ULTRAVOX Sound System

\$39.95

Add an exciting new dimension to sound on the C64/C128. Creates 100% stereo, with a built-in amp to power speakers directly. Also works with VCR & TV

E.M.C.S. Music Construction Set

\$29.95

The powerful music processor for the C64, Plays 32nd notes, allows long compositions A 2 disk set, also 40 pre-recorded songs.

BRAND X 64 Disk Cataloger

\$19.95

4,000 files or 100 disks. Add, save, etc. Identifies 14 file types, print lists in 1, 2 or 3 columns, prints disk labels.

VIDEO LOG 64

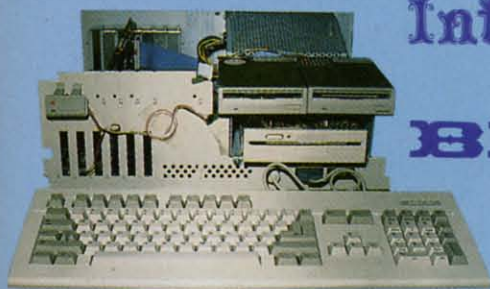
\$19.95

Catalog the movies you have saved on your VCR. 1,000 films or 250 tapes. Print list of titles/tape #, labels for tapes. Data saved: title, start/end, length, category

AMIGA SECTION

PREVIEW *the* AMIGA 2000

FEATURING
Profound Prestidigitation,
Internal Expansion
AND A
BRIDGE TO
the
WORLD
OF
BIG BLUE



It has been well over a year and a half since Commodore presented the Amiga, amidst much fanfare, to a packed hall at New York's Lincoln Center. We have used this time to sit back, gather up our socks, and ponder the significance of this machine which still represents the forefront of microcomputing technology. Nor has Commodore been idle during this interval, as we found out at a private showing this past December. At that time we were treated to a sneak preview of the Amiga 2000.

The Amiga 2000 represents a maturing of the new technology which was introduced with the Amiga 1000. The Amiga 2000 will also serve as a bridge to the extensive world of "Business Computing" in terms of the IBM PC and its clones. In brief, the Amiga 2000 has all of the Amiga 1000 capabilities on a chassis equipped with *Kickstart* 1.2 in ROM, one megabyte of RAM, one Amiga slot (86 pin), five Zorro slots (100 pin), one video expansion slot, and four IBM XT/AT slots. The CPU will accommodate three disk drives internally and two more externally.

The Amiga Side

First and foremost, the Amiga 2000 is an Amiga. That is, we expect it to be fully compatible with all the software already developed for the Amiga 1000. The bulk of the operating system has been placed in a quarter megabyte of ROM. The need for the *Kickstart* disk, which present Amiga users are all too familiar with, has thus been eliminated. This will speed up the initialization of the machine, as only a single disk, containing *Workbench* or an application program, will be required at boot up.

With the operating system in ROM it will no longer be possible to change versions by booting from a different disk. To allow for the operation of software, which may require earlier versions of *Kickstart* for proper operation, it will be possible to switch to *Kickstart* in the system's RAM. However, the viability of this procedure will have to be evaluated separately for each application. Although this will occupy 256 kilobytes of us-

er RAM, it should not present a problem. We have found that software which requires the earlier *Kickstart* release will generally fail to properly recognize system RAM beyond the half megabyte of chip RAM. To allow for the possibility of operating system upgrades, the system ROMs will be socketed.

The Amiga 2000 represents a major addition to the hardware of the basic Amiga in nearly every regard. A clue to the extent of this expansion is given by the visible bulk of the CPU. Its sheet metal enclosure is a bit narrower than the Amiga 1000, but it is nearly twice its height. In addition there is no longer any space to slide the keyboard under the CPU. A cursory inspection reveals front panel positions for two 3½" disk drives and one half-height 5¼" drive. The default configuration includes only a single 3½" drive.

The optional drive slots may be filled with either floppy disk drives or hard drives of the appropriate size. The Amiga 2000 will be equipped to handle three internal and two external floppy disk drives for a total of three 3½" and two 5¼" drives. The hard

**Text and Photos
by Morton Kvelson**

DATA EAST BRINGS ARCADE REALISM HOME!



ENTER THE DATA EAST SWEEPSTAKES

OVER 100 PRIZES - Win free Data East Computer Games, a real Data East Arcade Game, and a trip for two to the National Arcade Expo!

No purchase necessary.
See participating dealers for details.
Void where prohibited. *

KARATE CHAMP® - Put on your black belt and challenge your friends or the computer through nine picturesque settings in this leading Martial Arts game to become the Karate Champ. For Commodore 64/128™ and Apple II® series.

COMMANDO™ - As the crack shot Commando, battle overwhelming odds to defeat advancing rebel forces! Armed with only a machine gun and hand grenades, you must reach the fortress. For Commodore 64/128™, Apple II® series, and IBM.

IKARI WARRIORS™ - Behind enemy lines, guerilla warfare are your tactics as you and your partner battle through the jungles, rivers, ruins, and opposing entrenchments in this interactive 2-player arcade hit. For Commodore 64/128™.

BREAKTHRU™ - Your mission is to retrieve the secret fighter plane stolen by hostile renegades. Use your sophisticated assault vehicle to Break Thru each of the five enemy strongholds. For Commodore 64/128™.

EXPRESS RAIDER™ - Bandits have seized the Gold City Express. Rescue the passengers, save the train, and recapture the loot! For Commodore 64/128™.

TAG TEAM WRESTLING™ - Teamwork and stamina are the keys, as you and your partner battle your way through the Title Matches on your quest for the belt. For Commodore 64/128™, Apple II® series, and IBM.

KUNG-FU MASTER™ - Battle the evil forces through the five dangerous floors in the wizard's castle to rescue the captive fair maiden. For Commodore 64/128™ and Apple II® series.

DATA EAST

DATA EAST USA, INC. 470 NEEDLES DRIVE, SAN JOSE, CALIFORNIA 95112. (408) 286-7074.

© 1986 DATA EAST USA, INC. *COMMANDO, IKARI WARRIORS, AND KUNG-FU MASTER MFD. UNDER LICENSE FROM CAPCOM USA, SNK CORP., AND IREM CORP. RESPECTIVELY. COMMODORE, APPLE, AND IBM ARE REGISTERED TRADEMARKS OF COMMODORE ELECTRONICS LTD., APPLE COMPUTERS, INC., AND IBM, RESPECTIVELY.

* DATA EAST SWEEPSTAKES - OHIO RESIDENTS MAY ONLY ENTER BY MAILING A 3" X 5" POSTCARD TO: DATA EAST, P.O. BOX 519, SAYREVILLE, NEW JERSEY 08872.

drives will require an optional hard disk controller card. Commodore will be offering a DMA hard disk controller card which will include ST 506 and SCSI ports.

The basic machine will come equipped with one megabyte of RAM internally expandable to 9 megabytes (the Amiga 1000 may be expanded up to 8.5 megabytes). The default megabyte is equally divided between chip RAM and fast RAM. The default microprocessor will be the 68000 running at 7.14 MHz. An optional accelerator board, equipped with a 14 MHz 68020 microprocessor and a 68881 math coprocessor, will also be available from independent developers. The 68000 is internally a 32 bit microprocessor with a 16 bit address bus. The 68020 is the full 32 bit version of the 68000.

The Amiga 2000 provides for significant internal expansion of the hardware. In fact there are a total of seven expansion slots just for Amiga peripherals. The additional slots for IBM equipment will be discussed later. Five of the Amiga slots are designed in accordance with the 100 pin Zorro specification we discussed in the February issue. These slots will meet all the electrical requirements of the specification. However, the form factor of the expansion boards has been changed. The Amiga 2000's Zorro cards will have the same size and shape as the expansion cards for the IBM PC. If you read the *Amiga Section* in the February *Ahoy!*, you may recall our mentioning that Commodore had marked parts of the Zorro specification as seriously preliminary. Well, they certainly weren't kidding.

Fortunately, the electrical part of the expansion slots will still conform to the Zorro specification. Board makers will only have to change the physical layout of their cards. If the original board layout was done on a CAD system, then their redesign will require minimal effort. Commodore provided all Amiga developers with the details of the new machine at the Monterey Amiga developers' conference held last fall.

The sixth expansion slot is identical to the 86 pin external expansion bus on the Amiga 1000. Since it lacks any buffering, this slot permits direct access to the microprocessor's bus for the addition of coprocessors as in the accelerator board mentioned above. However, existing slap-on expansion boards cannot be readily plugged into this slot. Its internal location and orientation make this physically impossible. Once again, a minimal redesign of the board layout is all that will be required to modify existing slap-on card designs.

As the details of the new machine are already in the hands of existing Amiga developers, it would not surprise us if the present manufacturers of Amiga expansion cards had Amiga

2000 format boards available on the day the machine was released. We will also be looking for add-on cages for the Amiga 1000 which will duplicate some or all of the expansion slots provided with the Amiga 2000.

The addition of all this internal expansion has not resulted in a significant loss of external ports. In fact the only thing missing, which was present on the Amiga 1000, is the composite video output. The serial and parallel ports for printers, modems, and other standard peripherals will still be available. However, the serial and parallel ports will now conform to the IBM PC standard. This will permit the use of off-the-shelf cables with printers and modems. The dual mouse/joystick/light pen ports

Graphic Display Modes

Another release from our What's-all-the-fuss-about Department

Now that Commodore is preparing to enter the IBM PC market in a big way, we have started to look at what's available on the other side of the fence. One thing we couldn't help but notice was that an inordinate amount of fuss and attention was being given to IBM's new EGA (Enhanced Graphics Adapter) standard. This board, introduced in late 1984, costs between \$500 and \$1000 depending on the accompanying RAM. In return it will equip a PC with enhanced color graphics, making possible a host of new applications for the PC. Not unexpectedly, a host of clone makers are already offering substitute EGA

Graphics Formats for Commodore and IBM PC

Machine	Resolution (pixels HxV)	Colors
VIC 20	192 x 184	8 out of 8
Plus/4	320 x 200	121 out of 121
C-64	160 x 200	16 out of 16
C-64	320 x 200	16 out of 16
C-128	640 x 200	Monochrome
EGA (PC)	640 x 350	16 out of 64
CGA (PC)	320 x 200	4 out of 16
CGA (PC)	640 x 200	2 out of 16
MDA (PC)	720 x 350	Monochrome
Hercules (PC)	720 x 348	Monochrome
Amiga	320 x 200	32 out of 4096
Amiga	320 x 400	32 out of 4096
Amiga (HAM)	320 x 200	4096 out of 4096
Amiga	640 x 200	16 out of 4096
Amiga	640 x 400	16 out of 4096

EGA = Enhanced Graphics Adapter
CGA = IBM Color Graphics Adapter
MDA = IBM Monochrome Display Adapter

cards at prices of only \$300 to \$600—a fraction (although a large fraction) of the cost of the IBM offering.

Having become accustomed to reasonably detailed color graphics on several generations of Commodore computers, we decided to find out what all the fuss was about. Just what does IBM's EGA offer? The results are summarized in the accompanying table.

Internal Expansion

The Amiga 2000 is the first Commodore microcomputer to offer extensive internal expansibility. Technically, all of the previous Commodore machines were fully expandable via external add-ons. Practically, the actual expansion that could be done was very limited. Let us take a close look at the significance of internal expansion as it is implemented on the IBM and its clones and the Apple II family of computers, versus the externally expandable design of the Amiga 1000 and the C-64.

To begin with, many of the features that are taken for granted by Commodore users have to be added to the machines from Big Blue and the Fruit Company. An Amiga or C-64 out of the box can be connected to several external disk drives, a printer, and a modem. All of the internally expandable machines require accessory cards for these functions. The C-64 is equipped with a user configurable port for serial or parallel bidirectional data transmission. Once again, these functions are optional on Blue and Fruit. The Commodore machines come fully equipped for color or monochrome display on a video monitor or home television. Big Blue out of the box has no visual output whatsoever. The fruit machine does provide a signal for a video monitor, but the TV connection requires an add-on RF modulator.

As a result, a large part of the internal expansion on these machines is generally devoted to features which are built in on the

Commodore product.

The advantage of internal expansion is in the clear definition of the configuration for external peripherals. This is of the greatest benefit to third party peripheral manufacturers. In turn, the popularity of the host machine is significantly enhanced. A manufacturer of an IBM or Apple peripheral is able to guarantee that his product will function in the machine. The user has every reason to expect his add-on cards to function harmoniously with any other peripherals he may already have. If problems do arise, the responsible party is readily identified.

The provision for significant internal expansion also requires that the machine's power supply be designed for some amount beyond the immediate requirements of the main machine. For example, the Amiga 2000 will be equipped with a 200 watt power supply.

In the C-64 world peripherals will generally monopolize their associated expansion port. For example, multiple expansion port cartridges cannot be used. These cartridges will invariably conflict with each other. Commodore has addressed the compatibility problem on the Amiga 1000 by publishing autoconfiguration and intercard communication protocols. However, in the absence of a central testing agency, there are no guarantees that products from different manufacturers will function harmoniously. The presence of an internal expansion chassis in the Amiga 2000 provides the common ground for all peripheral makers.

have been moved to the front of the console.

Video display is the Amiga's 4096 color analog RGB or the more limited RGBI format. If composite video or modulated RF (for television use) is required, an optional video card will have to be installed. The composite video functions have been delegated to a dedicated video slot lo-

cated at the right rear corner of the main board. This slot may be used for an optional composite video or genlock type of peripheral. Commodore will be offering a video card which will provide standard NTSC or PAL video output. We expect third party developers to take advantage of this slot by offering specialized video applications for the broadcast in-

dustry. Many users of the Amiga 1000 have expressed interest in this type of expansion.

Disk drive expansion has not been neglected. The CPU can accommodate a second 3½" drive as well as a half-height 5¼" drive. The former is intended for the Amiga side while the latter is for use by the optional PC card. Alternatively, hard disk drive modules may be substituted for either the 3½" or 5¼" floppies. This still leaves room for two external drives, a 3½" unit and a 5¼" unit, both configured as Amiga drives.

The drive controller for the optional disk drives is built into the basic system. The optional Commodore DMA hard drive controller card will also provide connections for two ST-506 drives as well as an SCSI (Small Computer System Interface) port. The ST-506 format port is used by the IBM PC and its compatibles. The SCSI is the interface for the Apple Macintosh and is becoming something of an industry standard.

Some additional features have found their way into the system. The Amiga 2000 will incorporate a built-in clock/calendar with battery back-up. Users familiar with Amiga DOS will immediately recognize the value of this accessory. The keyboard has also been extended. The key count is now 94 (96 on the international version), up from 89 on the original Amiga. The numeric keypad has been extended to 18 keys, including open and close parentheses and all four of the basic math operators. All of the PC style labels have also been added to the front face of all the appropriate keys. The cursor keys are now in an inverted "T" layout, and the function keys have been separated from the main keyboard in PC clone style.

The PC Clone Side

The Amiga 2000 actually has the built-in hardware for adding a complete PC XT or AT clone. These machines utilize the 8088/8086 and the 80286 microprocessors. The potential also exists for expansion to include an 80386 microprocessor.

However, standards for the 80386 microprocessor expansion bus have not yet been established. This PC expansion has been implemented by incorporating an AT compatible, four slot expansion bus on the main circuit board.

The design of the Amiga 2000's expansion bus requires some qualification. The four PC slots consist of two AT type slots and two XT slots. The AT slots add a second 36 pin connector to the original 62 pin connector used by the XT style cards. However, the printed circuit traces for the AT extension are present for all four slots. Thus the additional AT connector extensions can be easily added if required. Note that the skirt overhang on many XT board designs limits their installation to the positions where the AT extension slot is vacant.

The two AT style expansion slots are in line with two of the Amiga's Zorro slots. This is essential to the design of the system. The PC XT or AT compatibility is achieved by installing a bridge card which spans one of the Zorro-XT/AT slots. This card will include an 8088 or an 80286 microprocessor, its own RAM and ROM BIOS, a pair of custom ICs to implement the Amiga-PC interface, and a disk drive interface. In effect this amounts to an XT or AT clone on a card. Inter system communication will be maintained via a 64 kilobyte, dual-port RAM as an inter-process buffer with a 64 kilobyte dual-port scratch memory on the Amiga side.

The XT version of the bridge card, model A 2088, will include an 8088 microprocessor running at 4.77 MHz, its own 512 or 256 kilobytes of RAM, 16 kilobytes of ROM BIOS and an interface for one internal and three external 5 1/4" 360 kilobyte disk drives. The system will use the Amiga's parallel port for printer interfacing unless a PC communications card is installed in one of the three remaining slots. The operating system, supplied with the card, will be MS-DOS version 3.2 which supports both 3 1/2" and 5 1/4" inch disk formats.

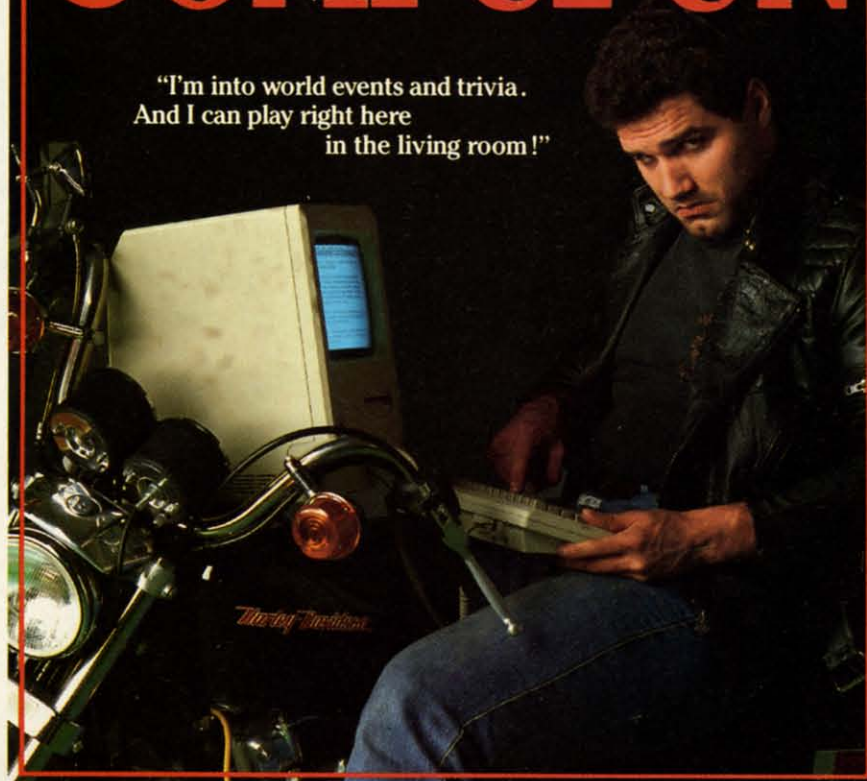
IBM type monochrome text and

COMPUTOUGH

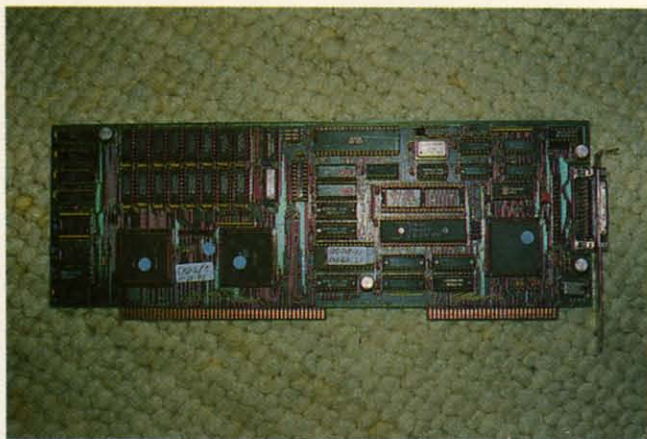


"If you think
you know how to play
Blackjack, meet me
at The Casino."

COMPUFUN



"I'm into world events and trivia.
And I can play right here
in the living room!"



The Janus or Bridge board (actual name not yet set) is a 1/2M IBM PC clone on a plug-in card. Zorro connector is to the left with PC connector to the right.

color displays will be available simultaneously through Amiga windows. The borders of these windows may be turned off to permit the full 80 column display. Since the PC displays are implemented using the Amiga's graphics, full user control of screen format and color is available via the Amiga's *Preferences* tool. This applies to both the monochrome and color PC windows. The PC windows may also be sized to run alongside any number of Amiga applications. The reduced size PC windows may be scrolled across a full PC text screen.

The PC side of the system will receive considerable support from the Amiga side. To start with, the shar-

ing of low cost, readily available PC peripherals will greatly enhance the operation of the Amiga system. The most notable example is the partitioning of hard disk drives for use by both systems. With this arrangement a low cost (under \$500) PC hard card may be installed in one of the PC slots. Under software control the hard drive's storage capacity may be partitioned for use by both systems. If desired, the entire capacity may be assigned exclusively to the Amiga.

Additional hardware and software applications will be forthcoming from Commodore as well as third party developers. These applications will promote greater integration between

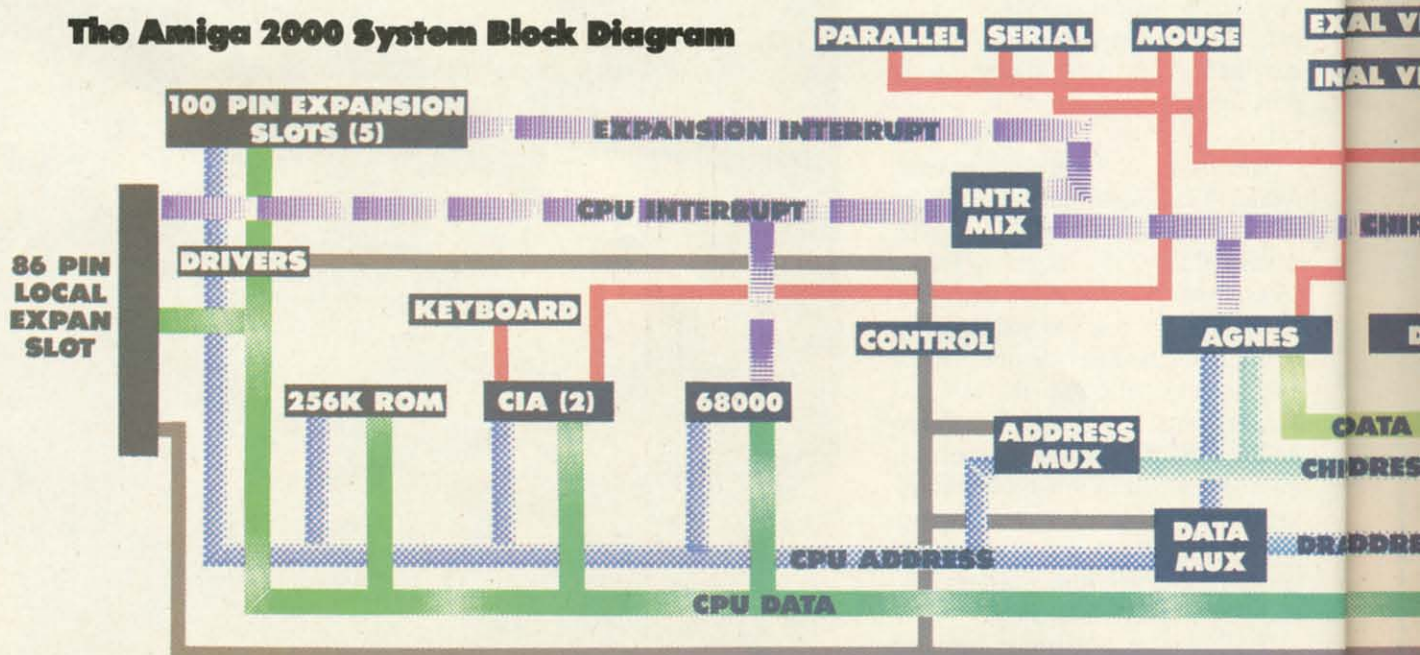
the Amiga and MS/DOS operating systems. One of the first of these utilities will support cut and paste operations between software packages running on the two systems. The possibilities are endless.

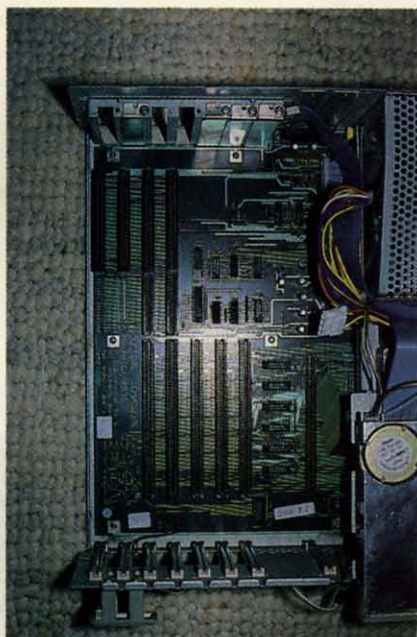
Conclusions

At a year and a half after its introduction the Amiga is still at the technological forefront of microcomputing. Nevertheless, the size of the PC "business" market is just too large to ignore. With the Amiga 2000 Commodore will be bridging the gap between the advanced features of the Amiga and the widespread "respectability" of the PC clones. In the process we feel that several notable things will be achieved. First, Commodore is demonstrating its continuing support for the Amiga design by offering a fully compatible and highly expandable upgrade path. Secondly, the "business" community will now have an excuse to buy an Amiga for their own use. Once it is in their hands we feel confident that the Amiga will make the proper impression.

With this new machine Commodore has effectively extended the definition of the Amiga's multitasking

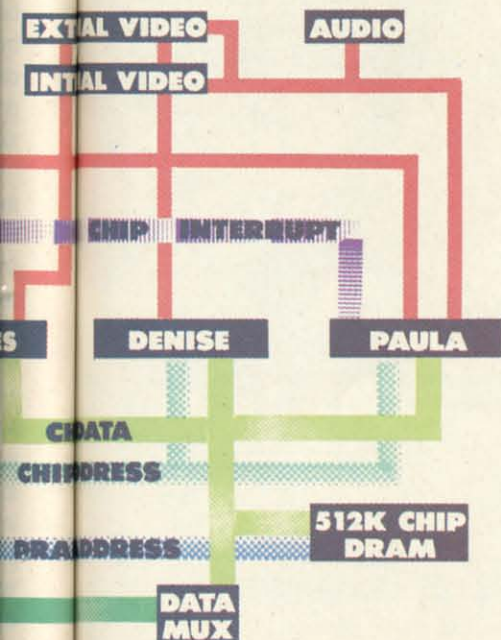
The Amiga 2000 System Block Diagram





Slot machine close up. Four PC XT type connectors at top, five 100-pin Amiga connectors at bottom.

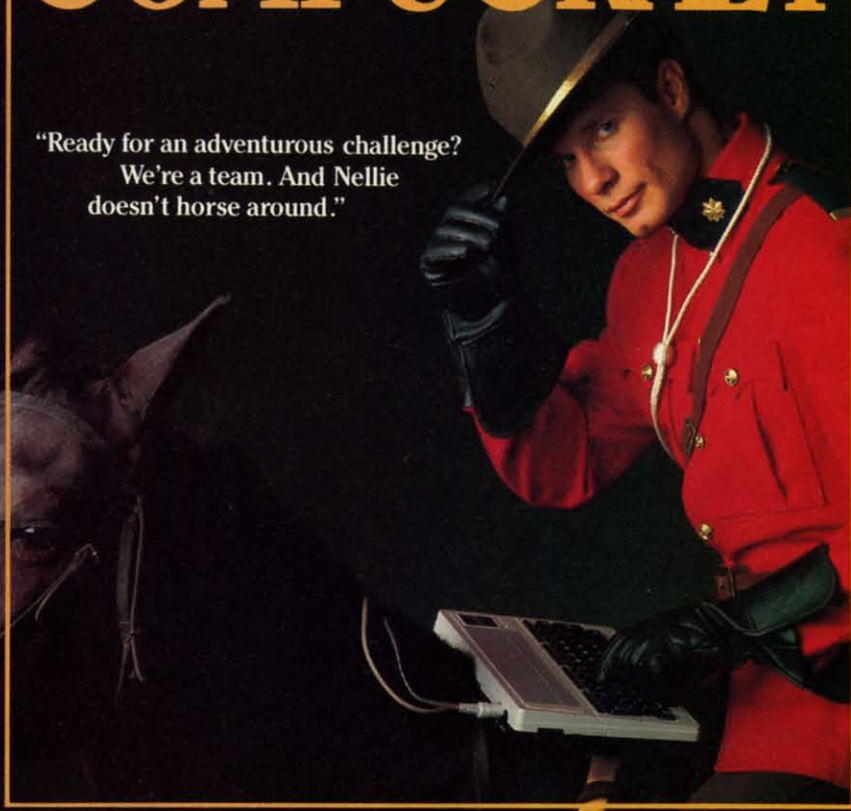
operating system to include multiprocessing and multioperating system. Since the add-on processors all have their own system resources, both hardware and software, they will all run at full speed. In this mode, the Amiga need only maintain appropriate windows for input and output.



JOANN CASE

COMPU CRAZY

"Ready for an adventurous challenge?
We're a team. And Nellie
doesn't horse around."



COMPU SERVE GAMES

You never know
who you'll be up against
when you go online
with CompuServe.

To buy your CompuServe Subscription Kit,
see your nearest computer dealer.
Suggested retail price \$39.95.

To request our free brochure or order direct,
call or write: **800-848-8199**
(In Ohio, call 614-457-0802)

CompuServe®

5000 Arlington Centre Blvd.
Columbus, OH 43220

BREAK THROUGH



The

Ahoy! uses only
maxell
premium quality disks.



with **Ahoy!**

BEST OF '85

Music Tutor
Midprint
Fontasia
Telelink
Futurewar!
Salmon Run
Auto Line Numbers
Home Budget
Tile Time
Screen Dump
Ahoy! Dock
File Lock
Lightning Loader
Directory
Manipulator
Gameloader
Jewel Quest

BEST OF '84

Multi Draw 64
Address Book
VIC Space Lanes
64 Space Lanes
Name that Star
Lunar Lander
Air Assault
Math Master
Biorhythm
Checklist
The Alpinist
Post Time
Salvage Diver
DOS
Micro Minder '85
VIC 40
Emerald Elephant
Lawn Job
Construction Co.
Space Patrol
Multi Draw Boot

BEST UTILITIES

Booter
BASIC Trace
Two Column Directory
Commodore Font Editor
Screen Magic
Screen Bit Dump
Printat
Auto Append
Formatter
Windows
Start & End File Address
Fastnew
Maestro
1541 Cleaning Utility
DOS
Base Conversions
Micro Minder '85
Lucky Lottery

BEST GAMES

Name That Star
Post Time
Alpinist
Salvage Diver
Lawn Job
Emerald Elephant
Construction Co.
Space Patrol
Tile Time
Duck Shoot
Script Analysis
Wizard of Im
Disintegrator
Gators N Snakes
Dragon Type
Gravinauts
Mystery at Mycroft Mews

PROGRAM DISKS AND CASSETTES

Why waste time typing?
All the programs in this
issue of *Ahoy!* are avail-
able on disk or cas-
sette! Use the cou-
pon below to order a
single disk or tape
or a subscription...
as well as the spe-
cial disks de-
scribed at left.

SINGLE ISSUE AND SUBSCRIPTION PRICES

(Postage and Handling Included)

	U.S.A.	CANADA	ELSEWHERE
<input type="checkbox"/> April '87 Ahoy! Disk	\$ 8.95	\$ 12.95	\$ 13.95
<input type="checkbox"/> April '87 Ahoy! Cassette			
<input type="checkbox"/> 12-Month Disk Subscription	\$ 79.95	\$ 99.95	\$124.95
<input type="checkbox"/> 12-Month Cassette Subscription			
<input type="checkbox"/> 24-Month Disk Subscription	\$149.95	\$179.95	—
<input type="checkbox"/> 24-Month Cassette Subscription			

\$10.95 EACH (disk only): ☐ Best of '84 ☐ Best of '85 ☐ Best Utilities ☐ Best Games

Make check or money order payable to **Double L Software, N.Y.** State Residents must add 8 1/4% sales tax.

BACK ISSUES \$8.95

In Canada add \$2.00 per issue; outside US
and Canada add \$4.00 per issue.

<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95

SPECIFY

☐ DISK ☐ CASSETTE

Send coupon or facsimile to:
Ahoy! Program Disk/Cassette
Ion International Inc.
45 West 34th Street, Suite 407
New York, NY 10001

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

New Amiga 2000 Peripherals

A 2088

An 8088 microprocessor board which provides PC XT compatibility. Price will be less than \$500 for a board with 512K of RAM.

A 2286

An 80286 microprocessor board which provides PC AT compatibility. Price and configuration to be determined.

A 2050

2 MByte Amiga RAM board which can be populated as ½, 1, or 2 MBytes. Price will be less than \$600 for the 2M version.

A 2058

8 MByte Amiga RAM board which can be populated as 4, 6, or 8 MBytes. Price is dependent on

the cost of the one megabit RAM chips when it is introduced.

A 2094

Amiga DMA Hard Disk Controller board for two ST506 hard drives plus an SCSI port. Price will be less than \$250.

A 2060

Amiga NTSC composite video and RF modulator board. Price will be less than \$100.

A 2002

RGB and composite video color monitor. Price will be under \$400.

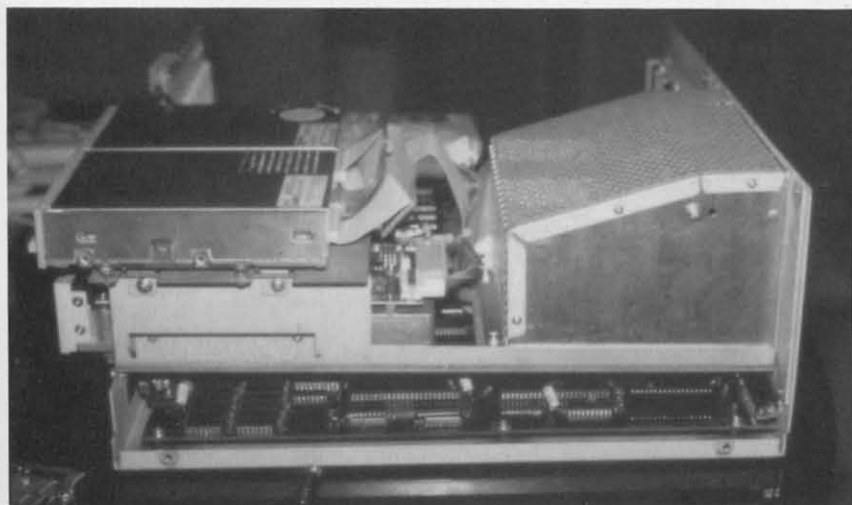
A 2080

Color monitor with long persistence phosphors for use with interlace mode. Price will be less than \$500.

This is a task which the Amiga does very well inasmuch as its operating system was designed with this in mind. Most of the windowing operations are handled by the Amiga's own trio of custom coprocessors, leaving the 68000 free to run unique Amiga applications.

In the ultimate scenario we can expect a multitasking operating system to become available for the PC world. This is the intended purpose of the 80286 and 80386 microprocessors. We find it interesting that although the PC AT is currently available, its

operating system is still that of the original PC. The operating system to take full advantage of the 80286 microprocessor is still six months to a year away. By comparison, the Amiga's operating system already had multitasking capability over one year ago. When this comes to pass we can see an Amiga 2000 multitasking several Amiga applications alongside a PC window which in turn may be multitasking several PC applications. In effect, the rest of the world will finally be catching up to where the Amiga was over one year ago. □



View from right shows disk drive stack and power supply enclosure. At bottom we have tantalizing glimpses of the RAM, ROM, and microprocessors.

Chip RAM v. Fast RAM

Chip RAM is so designated as it is the only RAM which is directly accessible to the Amiga's graphic and sound coprocessors. Data stored in chip RAM can be manipulated by the coprocessors without the intervention of the 68000 microprocessor.

The term fast RAM has been a source of confusion for Amiga users. The implication is that chip RAM is somehow slow by comparison. This is just not so. The speed of the 68000 is fixed by the internal clock at over 7.14 MHz. Thus code residing in chip or fast RAM can execute at the same speed. However, fast RAM is inaccessible to the Amiga's graphic and sound coprocessors. Any graphic or sound data must be first transferred to chip RAM by the CPU before it can be acted on by the coprocessors. It is this inability of the coprocessors to access fast RAM from which its speed advantage derives.

Most of the time, the 68000 and its coprocessors function in perfect harmony. The Amiga is designed so that access to RAM by the 68000 and the graphic coprocessor occur on alternate clock cycles. Occasionally the graphics coprocessor gets greedy by demanding more than its fair share of time. When this happens the 68000 is put on hold while the graphics coprocessor does its job. By comparison the 68000 is never forced to wait for access to fast RAM, no matter what the graphics chip may be up to.

Strictly speaking, a better name for the expansion RAM might be "RAM which cannot be accessed by the coprocessor chips, thus the 68000 is free to execute code without hindrance." Most developers find this to be somewhat cumbersome. Besides, it makes for poor advertising copy. As a result we have the somewhat misleading, but esthetically pleasing, fast RAM.

OUR PRICES WON'T BYTE

ABACUS		PRECISION		ACCESSORIES		ACTIVISION	
Basic 128	\$42.95	Superbase 128	\$56.95	WICO Boss Joystick	\$11.50	Alter Ego	\$29.95
Basic 64	29.95	Superbase 64	46.95	WICO Bat Handle		Cross Country Road Race	19.95
Cadpak 128	45.95	Superscript 128	47.95	Joystick	15.50	Mindshadow	19.95
Cadpak 64	29.95	Superscript 64	46.95	WICO Three Way		Murder on the Mississippi	21.95
Chartpak 128	29.95	TIMEWORKS		Joystick	18.95	Rocky Horror Show	18.95
Chartpak 64	29.95	Data Manager 128	\$42.95	Xetek Graphic Interface	54.95	Shanghai	21.95
Cobol 64	29.95	Data Manager II	29.95	Xeket Graphic Jr	34.95	Spindizzy	18.95
Cobol 128	45.95	Partner 128	42.95	RS 232 Interface	34.95	Transformers	21.95
Super C Compiler 64/128	42.95	Swift Calc 128 w/Sideways	42.95	Master Modern	34.95	Tass Times in Tonetown	21.95
Super Pascal	45.95	Swift Calc 64 w/Sideways	29.95	Flexidraw Light Pen	74.95	Gamemaker	24.95
		Word Writer 128 w/Speller	42.95	Disk Notcher	5.95	Gamemaker Sci/Ficition	14.95
		Word Writer 64 w/Speller	29.95	AICP Disks (10)	7.95	Gamemaker Sports	14.95
BRODERBUND		DIGITAL SOLUTIONS		Drive Cleaner	7.95	Hacker II	21.95
Where in the World		Pocket Filer 128	\$31.95	Disk Storage Case (70)	8.95	Music Studio	21.95
is Carmen Sandiego	\$21.95	Pocket Filer 64	24.95			Aliens	21.95
P/S Library 1-2-3 ea	15.95	Pocket Planner 128	31.95			Labyrinth	21.95
Print Shop	26.95	Pocket Planner 64	24.95			Howard the Duck	21.95
Print Shop Companion	21.95	Pocket Writer 128	31.95			Portal	25.95
Toy Shop	39.95	Pocket Writer 64	24.95				
P/S Holiday Library	15.95	MICROPROSE					
MICROLEAGUE		Conflict in Vietnam	24.95				
General Manager Disk	\$24.95	Crusade in Europe	24.95				
Micro League Baseball	24.95	F-15 Strike Eagle	21.95				
Team Disks	16.95	Gunship	21.95				
RIBBON		Silent Service	21.95				
Axiom Elite 5 LCD	\$ 5.95	Top Gunner	18.95				
Brother 15, 25, 35	5.95	SPRINGBOARD					
Commodore 1525	6.95	Certificate Maker	\$29.95				
Commodore 1526	6.95	Clip Art I	20.95				
Epson 185	6.95	Clip Art II	24.95				
Epson 85	4.95	Clip Art III	24.95				
Epson mx, fx, rx 100	6.95	Newsroom	29.95				
Epson mx, fx, rx 80	4.95	Graphic Expander	21.95				
Gorilla Banana	6.95	Certificate Maker#1	21.95				
Juki 6000	4.95	ACCESS					
Juki 6100	3.95	Leader Board	\$24.95				
Legend 880, 1080, 808	6.95	L.B. Tournament Disk	14.95				
MPS 801	6.95	Mach 128	30.95				
MPS 803	6.95	Mach 5	21.95				
OKI 182, 192	9.75	10th Frame	24.95				
OKI 82, 92, 83, 93	2.25	Triple Pack	14.95				
SG 10-15	2.25	HOT SELLERS					
(Min. 6 per order)		Star Fleet 1	\$29.95				
INFOCOM		Commando	21.95				
Enchanter	21.95	Gato	19.95				
Hitchhiker's Guide	21.95	Kung Fu II	19.95				
Invisicubes ea	6.00	Tag Team Wrestling	21.95				
Leather Goddesses		Strike Force Cobra	13.95				
of Phobos	21.95	X-15 Alpha Mission	19.95				
Spellbreaker	26.95	DATASOFT					
Trinity 128	24.95	Alternate Reality	\$24.95				
Zork 1-2-3	ea. 25.95	Conan	27.95				
DATAEAST		Crosscheck	19.95				
Commando	\$21.95	Goonies	18.95				
Karate Champ	21.95	Mercenary	18.95				
Kung Fu Master	21.95	Mind Pursuit	18.95				
Tag Team Wrestling	21.95	Never Ending Story	18.95				
GAMESTAR		Gunslinger	19.95				
Baseball	\$21.95	221B Baker St.	19.95				
Basketball 2 on 2	21.95	Theatre Europe	21.95				
Football	21.95						

CALL US TOLL FREE

Orders

1-800-634-AICP

Only

Customer Service
718-351-1864
10AM to 6PM
E.S.T.



AMERICAN INTERNATIONAL
COMPUTER PRODUCTS

P.O. Box 1758
Staten Island, N.Y. 10314
Reader Service No. 148

ORDER INFORMATION

In stock items shipped within 24 hrs. for prepaid orders (cert. check, visa, mc) C.O.D. Orders accepted, please add \$4.00, must be cash or cert. check ONLY. NYS residents add 8% sales tax. Advertised prices reflect a 4% discount for cash, credit card add 4%. All orders add \$3.50 shipping and handling within the Continental U.S. International orders add \$15.00 shipping and handling. Personal checks allow 2 wks. for clearance. Availability and pricing subject to change without notice. Free shipping in Continental U.S. on software orders over \$150.00. DEFECTIVE EXCHANGE ONLY FOR SAME PRODUCT. Restocking fee on unopened non-defective items returned. Returns accepted within 15 days of shipping date only. All returns require Return Authorization numbers. School inquires invited. WE DO NOT GUARANTEE COMPATIBILITY.

LAPS

For the C-64

By James C. Hilty

The most famous auto race in the world, the Ion International 500, is scheduled to be run this weekend. You have always dreamed of winning the grand prize of one hundred thousand dollars in cash and a year's subscription to *Ahoy!* Unfortunately there can only be 20 cars in the race, and 19 positions are already filled. You must post a better time in the qualifying laps than your opponent or it's wait till next year!

Laps is a two-player 3-D racing simulation for the C-64. The players take turns running three qualifying laps, and the racer with the best average time after the three laps is the winner. When the game is first run, a prompt asks for the names of the racers. If you wish to practice running laps alone, simply press the RETURN key for each name; otherwise enter the name of each racer (up to 10 letters). The name of the first player is displayed on the screen. The speed is shown as 50 mph. The player car (red) cannot go slower than 50 mph or faster than 300 mph. The racer uses a joystick in Port 2. The same joystick is used by both players. To begin your lap, press the fire button. Pushing the joystick up increases your speed, while pushing it down slows you down. Pushing the stick left or right moves you left or right. After your lap is completed your time is shown in the bottom half of the screen. The second racer's name comes up and he runs his lap. This continues until each player has driven three laps. The average time for each racer is then calculated and a winner is declared.

THE TRACK

The upper half of the screen shows your car on a 3-D racing track with a city in the background. If you hit the red and white track boundaries during a lap, your car crashes, time is added to your lap time, and your car must start at 50 mph. Your position in the lap stays the same. The same is true if you crash into one of the other cars that happen to be on the track. There are green cars on the track that travel at high speeds and there are yellow cars on the track that are moving very slow. These cars are obstacles and should be avoided, as a crash will cost you time.

Turns on the track appear suddenly and are very treacherous. If you enter a turn at too high a speed, you will fly off the track. Don't forget to steer your car when you are in a turn, or you will end up on the other side of the road or crash into another car.

STRATEGY

How you run your race depends on you and your oppo-



PHOTO: MICHAEL R. DAVILA

nent. A conservative race run at slow to moderate speeds could give you a decent time and force your opponent to try to drive a faster, more wide open race. The last lap for each player will often decide the outcome of the game. Remember, the winner is decided on the average time of all three laps, so one bad lap time doesn't put you out of the game.

Will your dream come true? Will you win a place in the Ion International 500? It is up to you, the race car driver, to decide your fate against a worthy opponent. □

SEE PROGRAM LISTING ON PAGE 107

tensoft
presents
The
Amazing

ARITHMETICIAN

For The Commodore 64® and 128™

"AT LAST a Math Game Kids Love to Play!"

JOHNNY CAN'T ADD? Suzy wishes she could outdo her friends in math? They'll both improve fast with ARITHMETICIAN! Here is a math game that kid's come back to—a game that quickly builds their arithmetic skills.

It features continuous fully orchestrated music and animated cartoons, a wide choice of skill levels from single digit addition through seven digit long division, and plenty of incentives, rewards and surprises. All for an incredibly low \$24.95.

NO RISK—Complete satisfaction or your money back.
Order TODAY and begin improving THIS WEEK!

Order by phone TOLL FREE with Visa or MasterCard 1-800-828-1829. In California call 1-800-626-6126.

☐ Please send me _____ Arithmetician disks at \$24.95 each.
(California residents add 6% sales tax.)
☐ Send FREE information only. ☐ Check or money order enclosed ☐ Visa ☐ MasterCard

Account No. _____ Expiration Date _____
Signature _____
Name _____
Address _____ Phone _____
City/State _____ Zip _____

Send to tensoft, P.O. Box 86971, San Diego, CA 92138

Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

Commodore 128 is a trademark of Commodore Electronics, Ltd.

DEALER INQUIRIES INVITED

Reader Service No. 125

When it comes to flying fighter planes

IT'S THE MAN— NOT THE MACHINE

that makes the difference



MIG Alley Ace: Thrilling head-to-head Sabre Jet aerial dog fighting includes single player flying mode, as well as two player competition.

Helicat Ace: Exciting 3-dimensional aerial combat over the Pacific in World War II. For one to four players.

Air Rescue: Sensational assault chopper rescue raids for daring pilots in solo or team configuration. For one to eight players.



See your local software retailer for this and other exciting MicroProse products. Or call direct for MC/VISA orders.

The Top Gunner Collection is available for Commodore 64 and Atari XL/XE computers at a suggested retail of only \$24.95.

Screen shots from Commodore 64.

Commodore 64 and Atari are registered trademarks of Commodore Electronics, Ltd., and Atari Inc.

Do you have what it takes?

- Guts
- Stamina
- Intense concentration
- Fast reflexes
- Willingness to take risks
- Good eye-hand coordination

If so, the Top Gunner Collection prepares you for the basics in flight training and combat tactics:

- Fly solo or in team configuration
- Maneuver in 3-D space
- "See and avoid" techniques
- Advanced aerobatics: loops, rolls, G's, split
- Outfly the enemy

"You'll experience the wind in your face and the intense dog fighting action of some of the world's most honored and respected combat aviators: the original stick-and-rudder fighter pilots!"

MAJOR BILL STEALEY,
U.S.A.F. Reserve
President, MicroProse
(over 3,000 flying hours)

MICRO PROSE
SIMULATION SOFTWARE

120 Lakefront Drive, Hunt Valley, MD 21030 (301) 667-1151

Reader Service No. 116

HACK-PACK

Metacomco

Commodore 128

Disk; \$39.95

BASIC 7.0 on the C-128 is the best BASIC Commodore has ever produced on an eight bit machine. Actually, among Commodore BASICs, its only competition comes from AmigaBASIC. Nevertheless, if you look hard enough (or even just a little bit) you can always find room for improvement. *Hack-Pack* for the C-128 feels that it has found that room for improvement, and on that point we will agree with them. *Hack-Pack* also bills itself as "The ultimate utility pack for the 128." We won't go so far as to agree with them on this point, but they are entitled to their opinion.

Hack-Pack is actually a collection of three utilities which will make life with the C-128 and BASIC 7.0 even better. We will look at each of these in turn.

Toolkit

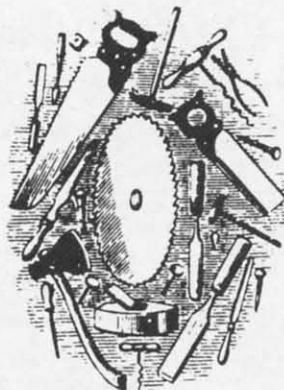
In deference to the *Hack-Pack* manual we will start with the Toolkit. As its title suggests, the Toolkit is a collection of commands which will make the editing of BASIC programs easier than before. To be specific, the Toolkit is a collection of eight commands which we list herewith:

Hack-Pack's Toolkit Commands

FIND	CHANGE
DUMP	INFO
MERGE	TYPE
SIZE	QUIT

If this selection seems a trifle sparse, be it known that it is deliberately so. *Hack-Pack* shuns the implementation of "nonsense commands that no one ever uses such as BEEP and FLASH!" (page 2 of the manual). Be that as it may, BASIC programmers will definitely find these commands useful. In particular the FIND and CHANGE commands are welcome additions.

The FIND command is one which no self-respecting programmer should have to do without. Yet for some reason, every version of Microsoft BASIC we have come across lacks this essential feature (Commodore BASICs all owe their origin to Microsoft, and the C-128 lets you know this in no uncertain terms). Even AmigaBASIC fails to rectify this sorry state. In all fairness, Commodore has in the past made some efforts to provide FIND for their loyal users. The VIC 20's *Programmer's Aid Cartridge* and the C-64's *Simons' BASIC* both included FIND commands in their repertoire.



FIND lets you specify and locate any text string in a BASIC program. It works on tokenized keywords as well as literals. With Toolkit you must flank the search-string with delimiters. A delimiter is simply any character that is not part of the search string. The quotation mark may be used as a delimiter, but it has a special effect. It places the computer into quote mode, which of course turns off tokenization. Thus quotes are used to locate literal text strings which may also contain BASIC keywords.

FIND's output is simply a listing of all program lines which contain the search-string to the screen. So if you have a long program, keep your finger in the vicinity of the C-128's NO SCROLL key. Alternatively you may redirect the computer's output to the printer using the traditional OPEN4,

4:CMD4 command string. Toolkit does not add the ability to redirect output to the printer in spite of the acknowledged usefulness of such a feature. When using CMD be sure to conclude the output with a PRINT #4 command to unlisten the printer and clear the printer's buffer. Failure to do so will result in problems with disk access.

The CHANGE command combines FIND with replace. All occurrences of the search-string will be replaced by the specified replacement-string. The range upon which FIND and CHANGE operate can be restricted by specifying a line-range, as with the C-128's LIST command.

The DUMP command provides you with the names and values of all your program's variables and the names of all functions and arrays. Note that only the names and not the contents of arrays will be displayed. DUMP accepts two modifiers which restrict its output to either variables or arrays. DUMP's output is formatted for the 40 column display no matter which display is actually in use.

The INFO command provides a detailed report of the memory usage by your BASIC program. This information includes the length of the program with separate figures for the memory used by variables, arrays, and strings. It also reports on the memory which is still available for program and variables. INFO is in effect an enhanced version of BASIC's FRE function. Unlike FRE, however, INFO cannot be invoked from within a program.

The MERGE command combines a program in memory with another program from the disk. MERGE is actually an append, as it does not mix program lines. The line numbers of the program being brought in from the disk must all be greater than the line numbers of the program already in memory.

The TYPE command reads an ASCII file from the disk and displays

W I L D C A R D

Draw A "Winner" With

BIG SAVINGS!

From Inkwell Systems

Inkwell Systems

1001 10th St. • San Diego, CA 92101
P.O. Box 85152 MB290 • San Diego, CA 92138
619/268-8792

D R A C D L I W

it on the terminal one screen at a time. After the first page you have the option of proceeding line by line or screen by screen.

The SIZE command returns the length of a file in bytes. Of course you can always estimate a file's size in kilobytes by dividing its length in blocks by four. This does not take into account the first two bytes of each block which act as a link to the next disk block. An additional error may be introduced by the last block of a file which may not be completely filled. The SIZE command eliminates all these uncertainties. FIND operates by simply reading the selected file and counting every byte till an end of file marker is encountered.

The QUIT command is simple enough. It disables Toolkit and returns its 2½ kilobytes to BASIC.

RAM-Disk

The RAM-Disk utility emulates a floppy disk in a portion of the C-128's built-in RAM. The advantage is of course increased speed. We found that the RAM-Disk was about 30% faster than a 1571 for loading programs. The real speed improvement was in saving programs. For this function we measured a six to one improvement. Of course the greatest benefit would be for users of

the 1541 in C-128 mode.

To be properly effective, the RAM-Disk should emulate the disk drive as much as possible. Most Commodore DOS commands are supported. The most notable exception was the lack of relative files. We were also unable to read the RAM-Disk directory with the LOAD "\$",9 command. Note that RAM-Disk defaults to device nine. The RAM-Disk directory could be displayed with BASIC 7.0's CATALOG command. The resulting directory listing looked just like that from a real disk drive. The only difference was that the drive number was always an "R" and the disk ID

K NOW

\$99⁹⁵ *Limited Time*

Flexidraw™

INTERACTIVE HI-RES GRAPHIC SYSTEM

Complete package includes
Professional Quality
Light Pen and Software

- Use to create Artistic/technical drawings
- Print in 3 sizes
- Full two year warranty

K

was always RD.

In addition to the standard DOS commands, RAM disk has a set of commands of its own. These control the size of the RAM-Disk and its location in the C-128's memory. The RAM-Disk memory need not be contiguous. It is possible to allocate blocks scattered throughout RAM to the RAM-Disk. Note that RAM-Disk is fixed in size unless specifically instructed to change. It will not automatically expand or shrink in response to the programs it contains.

The default RAM-Disk device number may be changed to suit your requirements. This lets you use RAM-Disk with more than one ex-

ternal drive or even as device number eight. Good disk drive programming practice requires that the disk drive error channel be checked after all disk operations. This is especially true with RAM-Disk, which does not have a blinking error light. An optional debug mode may be turned on to stop a BASIC program when a RAM-Disk error occurs.

Computer RAM is volatile storage. That is, all data is lost when the computer is turned off. Conversely there is no data in RAM when the computer is turned on. For RAM-Disk to be of any use there must be some way to insert and extract data. The simplest way is to load the data into normal RAM and then save it to RAM-Disk. Simply reverse the process to transfer data back to disk. This is fine for program files but distinctly awkward for sequential files. As such RAM-Disk is provided with its own COPY command for transferring files from floppy disk to RAM-Disk and back. Unfortunately, try as we might, we could not get this command to work with our system. All our attempts generated a file not found error on our 1571 disk drive.

Note that in addition to the space required by the RAM-Disk itself, the RAM-Disk program uses up an additional eight kilobytes.

K INTRODUCING

the Graphics Galleria™

\$24⁹⁵

A SERIES OF CLIP ART AND ILLUSTRATIONS FOR USE WITH Flexidraw AND PEEK!

Now Available:

- HOLIDAY THEMES
- CLIP-ART POTPOURRI
- BORDERS & SIGNS
- MAPS OF THE WORLD

K

Reader Service No. 142

Compressor

Last, and conceivably least, you will find the Compressor utility on the distribution disk. The Compressor exerts its influence upon a BASIC 7.0 program. When it has done its duty, the hapless program will be totally bereft of all REMs and superfluous spaces. In addition, the total number of program lines will be reduced to the extent that logic permits. This is achieved by concatenating program lines and eliminating the superfluous line numbers. The resulting program lines will contain up to 256 tokens and other characters. The whole thing reminded us of our days with a 3½ kilobyte VIC 20. The ostensible purpose of this exercise is to conserve space.

Of course the resulting program lines will be impossible to edit. The resulting program will also be impossible to comprehend. BASIC programmers tend toward spaghetti code even without this sort of encouragement. If you do go in for Compressor, be sure to retain your copy of the original program. Furthermore, in view of the C-128's large programming space, we wonder who would really find a use for this sort of thing. We suppose that anyone who keeps a VIC 20 alongside their C-128 would find this utility a real boon.

Compressor is simple enough to use. Simply copy the intended victim to a disk with some blank space and turn Compressor loose on it. When done you will find the original intact along with the compressed version. We succeeded in turning a 72 line program into a mere 11 lines in a matter of moments. Compressor is a two-pass process. As it functions, the program's original line numbers are displayed. This lets you monitor the program's progress. When done, Compressor displays the vital before and after statistics, which lets you see how well it did.

Compressor will function with the external disk drive or with the RAM-Disk. The latter is recommended for two reasons. First, compressing in RAM-Disk is much faster than on floppy disk. Second, it seems that Compressor does not work with all

versions of the 1541 and 1571 disk drives.

Conclusions

Hack-Pack is definitely a useful collection of C-128 utilities. We expect that you will find some of them more useful than others. The Toolkit was certainly a handy thing to have around. The RAM-Disk demonstrated considerable potential. Unfortunately, the RAM-Disk was more potential than performance. The Compressor utility did its job well enough, but we wonder if C-128 BASIC programmers really need such a thing.

Hack-Pack utilizes the color blindness copy protection method: the disk itself is not copy protected, but to gain access to the *Hack-Pack* utilities you will have to correctly identify three color swatches out of a 26 by 40 four color grid. This procedure is implemented every time you boot up. Keep a straight edge handy, as the grid is rather small, the dots are not terribly large, and it is difficult to line up the dots near the center of the array. This program comes with our official bifocal wearer alert.

Distributed by Metacomco, E. 5353 Scotts Valley Drive, Scotts Valley, CA 95066 (phone: in CA 800-GET-META; rest of US 800-AKA-META). —Morton Kevelson

POCKET WRITER 2

Digital Solutions, Inc.

Commodore 64/128

Disk; \$59.95

Digital Solutions' original word processor for the Commodore 64 was called *Paperback Writer*, but another software company already had a claim to the title. The program was consequently renamed *Pocket Writer*. Their new product *Pocket Writer 2* contains versions of the word processor for both the Commodore 64 and 128. Two C-64 versions are on the disk, one 40- and one 80-column. The 80-column version sacrifices a few features to give the 80-column screen. The C-128 version will only run in 80-column mode, so you'll need the appropriate monitor.

The users manual contains instructions for both versions, with the 128-

READER SERVICE INDEX

Page	Company	Svc. No.
29	Abacus Software, Inc.	111
C-4	Access Software Inc.	298
47	Activision	106
27	Alsoft	102
62	American Int'l Computer Products	148
50	Baudville	136
32-33	Berkeley Softworks	112
11	Bethesda Softworks	161
51	Business Opportunity Publishers	118
71	Business Opportunity Publishers	119
87	Business Opportunity Publishers	120
91	Business Opportunity Publishers	121
8	Commodore Business Machines	157
8	Commodore Business Machines	158
8	Commodore Business Machines	159
10	Commodore Business Machines	160
47	Central Point Software, Inc.	108
23	Cheatsheet Products Inc.	127
11	COMAL Users Group USA Ltd.	—
13	COMAL Users Group USA Ltd.	—
57,59	CompuServe	141
68	Computer Friends	143
35	Computer Mart	115
54	Data East USA, Inc.	138
C-2	Digital Solutions	109
48	Electric Dreams/Activision	107
41	Electronic Arts	131
69	Electronic One	144
82	Emerald Component Int'l	130
49	Free Spirit Software, Inc.	135
44	Gamestar	133
75	HesWare	146
31	Home & Personal Computers	140
13	INCA	149
66	Inkwell Systems	142
36	Jason-Ranheim	123
30	Ketek	114
34	KFS Software, Inc.	151
42-43	Lycu Computer	137
14	Master Software	152
40	Metacomco	129
15	Microcomputer Services	139
64	MicroProse Simulation Software	116
44	Mindscape	132
76	Ohio Computer Services, Inc.	145
9	Precision Peripherals & Software	300
80	Professional Handicapping Systems	155
4-6	Pro-Tech-Tronics	104
16-19	Protecto Enterprises	105
12	QuantumLink	122
83	Recovery!	—
7	R.J. Brachman Associates, Inc.	150
81	Skyles Electric Works	117
39	Software Discounters of America	103
22	Solutions Unlimited	110
25	S&S Wholesalers, Inc.	113
44	SubLOGIC	134
14	Superior Micro Systems, Inc.	154
28	TC Electronics	128
92	TecTrans	124
63	Tensoft	125
114	Timeworks	156
C-3	Timeworks	299
48	Unlimited Software Inc.	153
27	Value-Soft	101
85	Wedgwood Rental	126
70	Xetec, Inc.	147
10	Ahoy! Disk Magazine	—
12	Ahoy!/QuantumLink Offer	122
70	Ahoy! Binders	—
73	Ahoy! Back Issues	—
79	Ahoy! Access Club	—
84	Ahoy! Subscription	—

The publisher cannot assume responsibility for errors in the above listing.

MAC INKER™

MAC INKER™, Automatic Ribbon Re-inker. Re-ink any fabric cartridge or spool for **less than 5 cents.** Over 70,000 in the field and



we support **ALL** printers. Universal Cartridge or Universal Spool MAC INKER

\$68.50. We have cartridges re-inkable in 10 colors. Ask for your printer type or for complete listing. Bottle ink \$3.00/each. Shipping \$3.00.

PROTEUS™, the 'Siamese' Buffer.

It is a **Data Switch** with buffer on both ports. Switch manually or via software. Saves time, space and money. Or ask about our **MAC MASTER** line of Universal Buffers and Printer Controllers (serial or parallel up to 1 MEG).



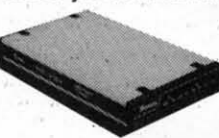
PROTEUS 64 K-199.00

256 K-299.00 Shipping \$4.00.

Of course we have **Data Switches**, serial/parallel, 2 way, 4 way, crossed etc., at most competitive prices (all lines switched).

CABLES priced \$10-25. We carry cables for all common computers and peripherals. Rapid turn-around on custom orders.

MERCURY MODEM. Really 100% Hayes* Compatible. 300/1200 baud, speaker, full status light display and 2 years warranty. Includes



QUICK LINK, easiest and most reliable Comms Software (available for IBM PC or Macintosh) **\$149.00** Shipping \$4.00.

*Hayes is a trademark of Hayes Microproducts.

MAC THE RIPPER. Our newest, original and welcome printer companion. Pulls off paper perforations and tears the sheets apart. Takes little space and will pay for itself almost immediately in saved time and tedium. Ask for brochure. Introductory Price **\$299.00.** Shipping \$10.00.

Order Toll Free.

Call or write for free brochure.

1-800-547-3303

In Oregon 503-626-2291 (24 hour line)

We are and always will be your

Computer Friends®

14250 N.W. Science Park Drive
Portland, Oregon 97229 Tel 4949559
Dealer inquiries welcome.

Reader Service No. 143

specific information highlighted in boxes with blue background coloring. The documentation is minimal. According to Digital Solutions, this is because of the extensive online help functions and the program's ease of use. I could see areas where hardcopy help would have been nice. Also, they should have turned their spelling checker on the manual after writing it, as it contains a number of errors that it might have caught.

Pocket Writer 2 has all the commonly expected word processing functions: insert mode, headers, footers, variable margins and line spacing, justification, right alignment, forced page breaks, and alternate pitch.

Cursor movement is logical. Arrow keys are used to move by character. Arrows in combination with the control key move longer distances. In the C-64 version, this sometimes means pressing three keys simultaneously, which can be troublesome to some typists.

Deleting is done by character, word, sentence, or paragraph. When you hit the key combination for delete you get a prompt asking which kind of delete. You then have to press the appropriate key to delete a character, word, sentence, or paragraph. If word or sentence is chosen, the removed text can be restored in the same place or moved to a new location. This is a quick way to copy or move a word or a sentence. I found this a bit clumsy to use because of the follow-up question. Maybe I'm too stuck on issuing a more specific command and getting immediate execution. You may find their way easier.

The range functions (delete, copy, clear, and move) were useless. When I tried them the computer locked up as I marked the beginning of the range. I could do nothing but turn the computer off.

The printer list is substantial and covers most of the popular printers used with the Commodores. Only a couple of interfaces are mentioned in the manual. The program supports underline, boldface, italic, and sub- and superscripts if the printer supports these features. Alternate pitch,

foreign characters and correspondence, or letter quality can be accessed with a little work on the part of the user.

The mail merge function is the equal of most that I've seen. Disk commands parallel those of other commercial programs. *Pocket Writer 2* does offer both ASCII and PET-ASCII and program or sequential file disk saves and loads. This makes it easier to transfer files to and from other word processors or via modem.

Another of the more unusual features is the ability to read in GEOS files. Documents held as text scraps in GEOS can be entered by pressing two keys. The C-128 version includes some enhancements that take advantage of the C-128's larger memory capacity. It works with either the 1350 or 1351 mouse and the two RAM expansion modules. I couldn't test the RAM access, as I don't have an expansion module on hand. You could use a joystick in place of the mouse in the 128 version.

A pull-down menu at the top of the screen offers six sub-menus: files, format, edit, find, print, and spell. The files menu controls disk access chores. Spell, find, and print are self-explanatory. Edit handles copy, move, delete, and clear commands. Format contains most of the commands that are left.

The C-128 version can also address two documents at the same time, so you can compare files and move sections of text between documents more easily. You can also assign a second disk drive as the data drive and not have to enter device numbers each time you access the drive.

Pocket Writer also comes with a spelling checker, but no dictionary for it. You can create your own or buy the \$14.95 dictionary from Digital Solutions. The spelling checker is built into the C-128 version, but is a separate program for the C-64. Each unrecognized word is flashed at you and you can either add the word to the dictionary, change the spelling, or skip the word. Changing the spelling requires typing in the new spelling for the word. It's not too bad as Commodore spelling checkers go.

I was disappointed (as I always am) to find that *Pocket Writer 2* is copy protected. The company does offer a backup disk for an additional \$13, though.

For those C-64 users who plan to upgrade to the C-128, this might be the best deal around. It costs nothing to acquire the C-128 version. At \$59.95, I think it is appropriately priced, though I would be happier if that price included the spelling checker dictionary. If bought as a module in the \$99.95 three-in-one pack (including *Pocket Planner 2* spreadsheet and *Pocket Filer 2* database) it's a real deal. Of course, the integration with a database and spreadsheet is only a factor if you have the other two programs.

Digital Solutions, Inc., 2-30 Wertheim Court, Unit 2, Richmond Hill, Ontario, Canada L4B 1B9 (phone: 416-731-8775). —Cheryl Peterson

EUPHONY

Precision Peripherals & Software
Commodore 64
Disk; \$39.95

Music programs for the C-64 are hardly a novelty. The 64's vaunted SID chip allows the computer to produce a wide range of audio effects of a much higher quality than other 8-bit systems, making it especially popular among binary Beethovens.

Euphony, however, is more serious minded than most such music programs. Unlike software such as *The Music Construction Set* (Electronic Arts), in which the user composes short pieces by clicking on and dragging a preselected note, rest, key signature, etc. to the appropriate position on the staff, music writing on the *Euphony* program is done exclusively in programming terms, by entering data into text files. This method, as the extensive documentation points out, has both advantages and drawbacks. On the plus side, files are much more concise and the program can handle extended compositions. (Program creator Jim Raymond says *Euphony* can store 50 minutes or more of music in a single gulp, a considerable improvement over the two and three minute range of other mu-

sic writing programs.) Entry in BASIC also permits more extensive manipulation of sequence repeats, tempo modulation, and other features not readily accessible with traditional music composition software.

The downside is fairly obvious: *Euphony* may well hold more appeal for musically inclined programmers than for computer-owning musicians. Although the BASIC programming techniques are pretty elementary, many note-slingers will be put off by such a seemingly nonmusical method of composition.

Euphony is not especially big on the visual gingerbread which makes most mainstream music programs so attractive, either. The main menu screen consists of eight commands (Play, Load, Repeat/Play All, Change Speed, Change Voices, Directory, Change Key, and Return to Basic) and the entry line. The musical scrolling staff and a color-coded (each of the three available voices is assigned its own hue, for easy tracking and playback), 5½-octave key-

board.

Euphony does have lots of impressive features, however, which belie its humble, homemade appearance. There are 16 durations and rests, including four triplets, 32nds, dotted 16ths, dotted whole notes, and ties. Up to 32 variables can be used to define any segment of music, and variables can be nested to a depth of seven levels. This system specializes in providing the user with complete access to all parts of the composition. Its attention to detail is such that each note can be selected as either legato or staccato, and changes can be implemented at any point, as often as the user likes.

The program also offers the standard C-64 music features: three voices, nine instruments (with synthesizer for constructing more), instant transposition, and continuous control over time, key, and tempo, as well as volume, for fashioning crescendos, decrescendos, and sforzandos. Another nice feature is the fact that *Euphony* doesn't make the user wait for

THE LOWEST
PRICES

THE BEST
SERVICE

ELECTRONIC ONE*

PHONE
LINES
OPEN

10-6 E.S.T.
M-F

CALL (614) 864-9994 • P.O. Box 13428 • COLUMBUS, OHIO 43213

Commodore

HARDWARE

64C 64k COMPUTER	169.99
128C 128k COMPUTER	239.99
1541C DISK DRIVE	179.99
1571C DISK DRIVE	229.99
1802C MONITOR	189.99
1902A RGB MONITOR	279.99
1702 MONITOR	179.99
COMPUTER ACCESSORIES	
1351 MOUSE	39.99
M-1 MOUSE	34.99
128k UPGRADE	109.99
512k UPGRADE	159.99
COMMODORE 300	
BAUD MODEM	49.99
COMMODORE 1200	
BAUD MODEM	129.99
MESSAGE MODEM	34.99
AVATEX 1200 MODEM	79.99
AVATEX 1200	
HC MODEM	119.99
PRINTERS	
STAR NX10	199.99
STAR NX10C	219.99
STAR SG10C	189.99
STAR POWER TYPE	179.99
PANASONIC 1080i	189.99
PANASONIC 1091i	259.99
SEIKOSHA 1000 VC	179.99

SOFTWARE

GEOS	39.99
PRINT SHOP	27.99
PRINT MASTER	27.99
NEWSROOM	39.99
MACH 5	22.99
MACH 128	27.99
FAST LOAD	24.99
TURBO LOAD & SAVE	17.99
WORD PRO W/TURBO	22.99
WORD PRO 128 W/FILE	22.99
SPREADSHEET	22.99
PROGRAMMER'S	
TOOL BOX	12.99
FILE PRO 64	18.99
POWER C	22.99
JANE	34.99
PAPER W/SPELL	28.99
SUPERBASE 64	49.99
SUPERBASE 128	59.99
POWER ASSEMBLER	29.99
SAT	12.99
POCKETWRITER 64	27.99
CERTIFICATE MAKER	28.99
PRINT SHOP	
COMPANION	22.99
DATA MANAGER 128	39.99
WORD MANAGER 128	39.99
SWIFT CALC 128	39.99

SOFTWARE SPECIALS

ACE	9.99
Z PILOT	6.99
COBRA	9.99
KUNG FU FIST	9.99
KUNG FU STICKS	9.99
SARGON II	6.99
SARGON III	22.99
JUKE BOX	2.99
STORY MACHINE	2.99
ALPHABET ZOO	2.99
DELTA DRAWING	2.99
COSMIC LIFE	2.99
ALF COLOR CAVES	2.99
UP FOR GRABS	2.99
FACE MAKER	2.99
ZORK 2	4.99
ZORK 3	4.99
CHESS	4.99
SUSPENDED	4.99
STARCROSS	4.99
DEADLINE	4.99
SATINS' HOLLOW	4.99
RALLY SPEEDWAY	4.99
HARDBALL	18.99
MICRO LEAGUE	
BASEBALL	18.99
SUPERBOWL SUNDAY	18.99
SUPERBOWL STATS	14.99

HOW TO ORDER: CASHIER CHECK, MONEY ORDER, MASTERCARD* OR VISA* (ADD 4% FOR CHARGE CARDS) ... NO PERSONAL CHECKS ... NO C.O.D.'s ... SHIPPED U.P.S. ... ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
SHIPPING: ADD \$3.00 ON ALL ORDERS UNDER \$100.00 ... ADD \$5.00 ON ALL ORDERS OVER \$100.00. ACTUAL FREIGHT CHARGED ON MULTIPLE ORDERS.
INTERNATIONAL: ACTUAL FREIGHT CHARGED ON ALL ORDERS OUTSIDE THE CONTINENTAL UNITED STATES INCLUDING A.P.O.
POLICIES: NO RETURNS WITHOUT A RETURN AUTHORIZATION ... NO RETURNS UNLESS DEFECTIVE. ALL DEFECTIVES WILL BE EXCHANGED ... NO EXCEPTIONS.
PLEASE SPECIFY ... CALL OR WRITE FOR FREE CATALOG

CALL ELECTRONIC ONE (614) 864-9994 OR WRITE

Reader Service No. 144

Keep Your Collection Looking Shipshape with **Ahoy!** Binders



Don't be caught at sea the next time you need valuable programming information from a back issue of *Ahoy!* Our official binders turn a year's worth of *Ahoy!* into a textbook on Commodore computing! These quality-constructed binders use metal rods to hold each magazine individually, allowing easy reference to any issue without removal. Sporting a navy blue casing with a gold *Ahoy!* logo imprinted on the spine, these binders will be the pride of your computer bookshelf.

To order, send \$12.45 (US funds) for each binder desired to:

Ahoy! Binders
45 West 34th Street—Suite 407
New York, NY 10001

(Outside Continental US add \$2.50 per binder. Allow 4 to 6 weeks for delivery.)

long loads, since everything is entered into the C-64 in RAM at the same time.

For those users not interested in composing original music, *Euphony* offers an extensive library of prerecorded classics and popular favorites (though *Euphony* is definitely oriented toward classical music). Selections include Prokofiev's "Peter and the Wolf," Debussy's "Golliwog's Cake Walk," Mozart's 11th, 16th, and 19th Sonatas, Bach's "Brandenburg Concerto #3," and Tarrega's "Recuerdos de la Alhambra," with "Rock of Ages," "Amazing Grace," and a handful of Christmas carols for non-longhairs. These pieces can be simply played back, or used as the basis for experimentation. By altering the speed, instruments, and key, familiar orchestrations can be modified and even refashioned (try mixing Bach and rock by altering the playback speed on the "Brandenburg Concerto"; or replay Ludwig Von's melodic "Waldstein" at dirge tempo for an experience in audio surrealism).

As selections play back, the appropriate notes are highlighted both on the staff and on the color-coded keyboard, giving *Euphony* an educational dimension; there is something enlightening about "seeing" a musical score play out, note by note. The way in which the individual sounds interweave and overlap to create a new texture is not only instructional, it is quite fascinating.

Euphony is a real working class program; it isn't pretty, but it does a lot more work than most of the glamour software working the same side of the street. What you see is what you get with *Euphony*. Its greatest strength (all music is entered in BASIC, allowing greater flexibility and duration) is also its greatest weakness (all music is entered in BASIC, which is, quite frankly, a drag, unless the user intends to spend considerable time learning the programming system or is already familiar with the language).

Euphony also supports most major printers (Epson FX, MX, Star Micronics Gemini 10, 15, and "possibly others," according to the docs) to produce hard copy of your musical notation. It is also possible to compose a piece of music and give it to friends for playback. The system whereby this is possible essentially removes copy protection from this program; Precision Peripherals & Software take a tremendous leap of faith and request that users only copy music they themselves have written.

As to the quality of the sound itself, it is not going to blow the doors off veteran C-64 music mavens. Most of the compositions are difficult ones, however, designed to show off *Euphony's* powerful music writing capabilities, and in this sense they are quite impressive. It is not unlikely, however, that talented users will be able to produce work of equal or superior quality after a few weeks on this system.

Manufactured by TCO Software, P.O. Box 81504, Fairbanks, AK 99708 (phone: 907-479-4898).

Distributed by Precision Peripherals & Software, P.O. Box 20395, Portland, OR 97220 (phone: 503-254-7855).

—Bill Kunkel



XETEC **\$59.95**

Copyright (c) 1986 Xetec, Inc. All rights reserved.

A powerful word processing system for the Commodore 128
 Includes: • On screen status/help display • 45 Fonts ready to use
 • Font editor/creator included • Foreign Language Disk

From the author of *FONTMASTER II* comes *FONTMASTER 128*, an enhanced version for the Commodore 128. This powerful word processor, with its many different print styles (fonts), turns your dot matrix printer into a more powerful tool. Term papers, newsletters and foreign languages are just a few of its many applications. Here are some of its capabilities:

NOW WITH NO COPY PROTECTION — USES HARDWARE KEY

Word Processing Features

- Over 65 powerful commands make text editing a breeze
- 45 • Fonts (includes Russian, Greek, Hebrew, Arabic)
- Room for 9 SUPERFONTS concurrently
- Text memory: approximately 54k Bytes
- Supports more than 100 printers
- 80 columns
- PRG file merge
- File names can be picked from disk directories
- 4 keyboard macros
- Headers/footers

Word Processing Printing Features

- 50 • two letter format controls (embedded in text files)
- Fractional character spacing used on word-wrap, justification, centering, and right alignment
- Proportional spacing (user adjustable)
- Columnar printing (up to 4 columns)
- Overlaying of 2 or more characters (for phonetic markings, diacritics, etc.)
- 30 single-keystroke text modifiers (embedded in text files)
- Combine any or all of the following effects: underlining (adjustable) more than 20 pitches; more than 50 line spacing sizes; condensed text; boldfacing; inversion (white letters on black); superscripts (adjustable); 3 text heights (micro-normal-tall)

Setup Module

- Two system setups can be made. In each, user can select his preference of colors (screen, text, cursor, printer interface (20 choices), and printer (over 100 choices))

Font & Character Set Creators

- Disk commands for maintenance of fonts or sets
- Grid for character creation/editing (manipulated with cursor keys, joystick, or light pen)
- Editing commands include: invert, flip, negate, shift, clear, copy
- Character can be printed while editing (font creator only)

Bouhaus	Futura	Monogram	Stencil
Broadway	Goodtype	News	Stop
Burgundy	Hairpin	Old English	Tech
BUSORAMA	Italic	Pierrot	αβγδϵζηθ
Celtic	Manhattan	Print	ΑΒΓΔΕΦΗ
Chonopium	TOITIM	Scalpel	αβγδζηθ
Freeland	αβγδμνπ	Shadon	αβγδζηθ

XETEC, Inc. • 2804 Arnold Road • Salina, KS 67401 • (913) 827-0685
 Reader Service No. 147



Why Are We Giving Away Your Choice of Today's Popular Top Hit Tapes and Records ...

each for only a **30¢** **SUPER DISCOUNT COUPON** everytime you buy another hit of your choice at regular retail price?
THIS PRICE IS NOT A MISPRINT! which currently are \$7.98 to \$9.98—plus shipping and handling. (Multiple-unit sets and Double Selections may be somewhat higher.)
 Plus Shipping & Handling

Until midnight May 29, 1987 – we will give you these booklets of thirty 30 cents coupons for only

\$9 Per Booklet Of Thirty 30¢ Coupons **Good for any 30 top hits of your choice \$269.40 value!**

- Super Discount Coupons Are Guaranteed Redeemable One-By-One Or As Many As You Like At A Time.
- No Need To Use Up Your Coupons All At Once, If You Don't Want To – Coupons Are Redeemable Until May 12, 1988.
- A Printed Chart Accompanies Each Coupons Booklet Listing Hundreds Of The Nation's Hits In All Categories Of Music.

As part of a nationwide publicity campaign, an innovatively bold, pioneering North Carolina firm will give away one million (1,000,000) Guaranteed Super Discount Coupons Booklets for the Shocking Publicity Price of only \$9 a booklet to every person who reads this publicity campaign ad and writes to the company address (below) before midnight, May 29, 1987.

You absolutely must send this Original Publicity ad along with your request. No copies or Photostats accepted.

Please note that – even though the company's astonishing price of \$9 per coupons booklet will expire on the above mentioned May 29, 1987 date – however, you will be allowed a much longer time period to redeem your super Discount Music Coupons. A \$269.40 value.

The company guarantees that it will promptly, redeem all coupons sent in for redemption – all the way up until May 12, 1988. That's plenty of time for you to use up all your coupons. Also you are permitted to transfer your coupons, to someone else to redeem, if you wish. These Super Discount Coupons make excellent gifts too.

Each Super Discount Coupons Booklet contains 30 coupons, which can be redeemed for any of the current national bestseller tapes, and records. All are original artists, on the original labels. No counterfeits, no bootlegs, and no sound-alikes! You'll receive the same Popular recordings played on radio stations everyday. Included, along with your order – you'll get an up-to-date chart, listing hundreds of the very latest hits to choose from.

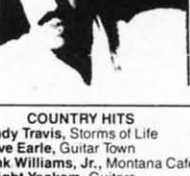
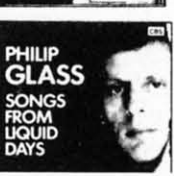
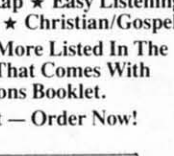
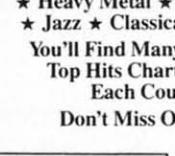
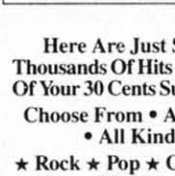
These are the same popular, nationally advertised Top Hits Super Discount Coupons Booklets you may have already heard about.

These Super Discount Coupons offer the easiest low cost way to build a fantastic music collection fast! Many music buyers everywhere have used these coupons to save themselves some really good money.

Now, you can own every current hit tape, and record, that you want. You too can enjoy these fabulous savings that Super Discount Coupons bring.

Every Music lover in America would love to get their hands

Don't Forget – This Amazing Low Price Offer Expires May 29, 1987 To Readers Of This Publication.



on them – So don't risk missing out by responding too late! These are the fastest selling, and most sought-after Super Discount Coupons ever sold by this most enterprising North Carolina firm.

These popular, Nationally Advertised Super Discount Music Coupons will not be sold at this price by the company in any store. There is a limit of just Two (2) booklets per address at this price, but if your request is sent early enough (before May 24) you are allowed to request up to 5. Each booklet is strongly backed by the company's full one-year money-back guarantee.

To order your Guaranteed Super Discount Coupons mail this entire original publicity ad (no copies or photostats accepted) along with your name and address and \$9 for each Coupons booklet. Add only \$1 shipping per booklet ordered (North Carolina residents add sales tax.) Allow up to 3 to 5 weeks for shipment. Make check payable to Top Hits Clearinghouse.

Mail to Top Hits Coupons Booklets, Dept. AM-2, 110 West 5th Street, Winston-Salem, North Carolina 27101.

- COUNTRY HITS**
- 1 Randy Travis, Storms of Life
 - 2 Steve Earle, Guitar Town
 - 3 Hank Williams, Jr., Montana Cafe
 - 4 Dwight Yoakam, Guittars, Cadillac, Etc., Etc.
 - 5 George Strait, #7
- BLACK HITS**
- 1 Cameo, Word Up
 - 2 Anita Baker, Rapture
 - 3 Run-D.M.C., Raising Hell
 - 4 Oran "Juice" Jones, Juice
 - 5 Lionel Richie, Dancing On The Ceiling
- JAZZ HITS**
- 1 Andreas Vollenweider, Down To The Moon
 - 2 Spyro Gyra, Breakout
 - 3 Pieces Of A Dream, Joyride
 - 4 Bob James/David Sanborn, Double Vision
 - 5 Yellow Jackets, Shades
- CLASSICAL HITS**
- 1 Vladimir Horowitz, Horowitz: The Studio Recordings
 - 2 Vladimir Horowitz, Horowitz: The Last Romantic
 - 3 Kathleen Battle, Kathleen Battle Sings Mozart
 - 4 Branford Marsalis, Romances For Saxophone
 - 5 Luciano Pavarotti, Anniversary
- CHRISTIAN/GOSPEL HITS**
- 1 Rev. M. Brunson/Thompson Community Choir, There Is Hope
 - 2 The Williams Brothers, Hand And Hand
 - 3 Douglas Miller, Unspeakable Joy
 - 4 Shirley Caesar, Celebration
 - 5 Sandra Crouch, We're Waiting

Just try finding any record club or store anywhere – that will give you all the current hits for the astonishingly low price of only 30¢ each! Just a mere \$9 for a booklet that's redeemable for 30 hits ... a \$269.40 value!

TIPS AH-OY!

Compiled by Michael R. Davila

We'd like to keep *Tips Ahoy!* the Commodore community's number one forum for short, helpful programming routines and hardware hints. To that end, we invite you to forward your best efforts to:

Tips Ahoy!
c/o Ahoy! Magazine
Ion International Inc.
45 West 34th Street—Suite 407
New York, NY 10001

Payment is made upon acceptance.

CENTERING 40 COLUMNS IN 80 COLUMN MODE

Commodore 128 owners know that their 64 programs written in BASIC 2.0 will run without a hitch in the 128's 40-column mode. In 80 column mode, however, the display is unbalanced, with all characters printed to the left half of the screen. The WINDOW command of BASIC 7.0 could correct this easily, but would make the program unusable on a Commodore 64.

The following line is invisible to the 64 and 40-column 128. When using 80 columns, it will give you a perfectly centered display.

—Ed Horgan
Coatesville, PA

```
10 IF PEEK(231)=79 THEN POKE 230,21 : POKE 231,60
```

C-128 BUG FIX

We will know about the ominous CAPS-LOCK 'q' bug in the C-128. Or do we? In any case, it definitely managed to slip by Commodore. Try it. First switch to lower/upper case mode (so as to better see the problem) by holding down the SHIFT key while depressing the Commodore logo key. Next depress the CAPS-LOCK key and hit the 'Q' key. If you see a lowercase 'q' instead of an uppercase 'Q' then your C-128 suffers from the CAPS-LOCK 'q' syndrome.

If you find that you can't live without the real CAPS-LOCK 'Q' and definitely want your 128 cured of this affliction, the following short routine may save the day for you. Type it in and save it before you run it, as it erases itself after being run. It also steals 89 bytes of RAM memory starting at memory location \$1300 (HEX). Once run, the CAPS-LOCK 'q' correction will survive about anything except a cold reset (via the side reset button) and, of course, turning off the computer.

—Jim Partin
Cincinnati, OH

- 10 REM FIX FOR CAPS-LOCK + 'Q' BUG ON C128
- 20 REM BY JIM PARTIN (8/19/86)
- 30 REM COPY CAPS-LOCK DEF. TABLE INTO RAM
- 40 FAST

- 50 FORT=1TO89:POKEDEC("1300")+T,PEEK(DEC("FBE4")+T):NEXTT
- 60 POKE840,DEC("00"):POKE841,DEC("13"):REM CHANGE TABLE POINTERS
- 70 POKEDEC("1300")+62,209:REM FIX!
- 80 SLOW:END

PASSWORD

Do you have BASIC programs that you would like to protect from prying eyes? Do you own a C-128? Are you reading this line? If you answer yes to all of the above questions, do I have a utility for you. *Password!* *Password!* will protect your programs by taking a code that you select of up to 160 characters and scrambling the program so the only way to use it is to unscramble it using the same code. Now, in order for someone to use your program, they must know the password!

There are many ways to utilize this program, but the procedure I prefer is outlined below.

First, run PASSWORD.CRE so it can create an ML file on disk using the name "PASSWORD.ML". Next, BLOAD "PASSWORD.ML" and then load the program to be protected. Enter SYS 5555,0 and type a password (code) of up to 160 characters for the program. This password is used to scramble the program. Be patient: it may take a couple of seconds. When the cursor reappears, LIST the program. As you can see, only the first line is visible. Don't let this fool you—the program has been scrambled. Now save your protected program. Any time you load the protected program from disk you must unprotect it. To unprotect the program BLOAD "PASSWORD.ML", SYS 5555,1, and provide the same password you used to scramble the program. Again, in a matter of seconds your program is unprotected. What I do, since the first line is not scrambled, is save a copy of PASSWORD.ML on every disk that I have protected programs on, and before scrambling each program I make the following line the first line of each program:

```
0) BLOAD "PASSWORD.ML":SYS 5555,1
```

Now, a sample RUN "filename" loads the protected program and the program to unprotect it. The BASIC program will continue to run after it has been unprotected.

A Syntax Error will likely be displayed with this program when called from direct mode. Nevertheless, you can be sure that the program has done its job.

—Shawn K. Smith
Bronx, NY

- 100 REM* PASSWORD.CRE FOR BASIC PROGS.
- 110 REM* (A) SHAWN K. SMITH PRODUCTION
- 120 DATA 48,A2,00,8E,00,FF,20,7D,FF,50
- 130 DATA 41,53,53,57,4F,52,44,3F,20,00

Back Issues

Use the coupon below to complete your collection of *Ahoy!*, and catch up on all the programs and articles you've missed in the past three years! Issues 1 and 4 are sold out, and 2 and 3 are down to a handful...so order before the magazines you want disappear from stock.

ISSUE #2—FEB. '84 \$10.00 Illustrated tour of the 1541! Artificial intelligence! Synapse's Ihor Wolosenko interviewed! And ready to enter: Music Maker Part III! Screen Manipulation! Night Attack! Relative Files!	ISSUE #10—OCT. '84 \$4.00 C-64 graphics programs! Bit-mapped graphics! Joystick programming! And ready to enter: VIC 40 Column Operating System! BAM Read & Print! Emerald Elephant! Lawn Job!	ISSUE #18—JUNE '85 \$4.00 Music & graphics entry systems! How modems work! Inside the 6510! And ready to enter: Quad-print! Mapping 4.4! Towers of Hanoi! Speedy! Duck Shoot! The 6510 Simulator!	ISSUE #29—MAY '86 \$4.00 128 graphic bit map! Epyx strategy guide! 128 commands! ML music programming! And ready to enter: Bigprint! Star Search! Failsafe! English Darts! Ski Folly! Free RAM Check! Alchemist's Apprentice!
ISSUE #3—MAR. '84 \$10.00 Anatomy of the 64! Printer interfacing for VIC & 64! Educational software series begins! And ready to enter: Address Book! Space Lanes! Random Files on the 64! Dynamic Power!	ISSUE #11—NOV. '84 \$4.00 Music programs & keyboards for the 64! Graphics feature continues! And ready to enter: PTE word processor! Block Editor! Alternate Character Set for the 64! The Tunnel of Tomachon!	ISSUE #19—JULY '85 \$4.00 PROM programming! 3-part harmonies on VIC/64! Speeding pixels! And ready to enter: Auto-Append! Script Analysis! Wizard of Im! Lucky Lottery! Brainframe! Etch! Printat!	ISSUE #30—JUNE '86 \$4.00 Debugging dilemmas! Public domain software! Winning at Ultima! Computer Aided Design! And ready to enter: LazyBASIC! Got A Match? Star Strike! Queen's and Bishop's Tours! Shaker! Trackdown!
ISSUE #5—MAY '84 \$4.00 Future of Commodore! Inside BASIC storage! Memory management on the VIC & 64! Guide to spreadsheets! And ready to enter: Math Master! Air Assault! Biorhythms! VIC Calculator!	ISSUE #12—DEC. '84 \$4.00 Buyer's guide to printers! 1525 printer tutorial! Custom characters! User Guide to KMMM Pascal! Diving into BASIC! And ready to enter: Construction Co.! Space Patrol! Cross Ref!	ISSUE #20—AUG. '85 \$4.00 Inside the 128! Read-world simulations! Sound effects! And ready to enter: Windows! Formatter! Sound-a-Rama! Screen Dump! Selectachrome! Disintegrator! Fidgets! Gators N Snakes!	ISSUE #31—JULY '86 \$4.00 Inside the Amiga! Conditional branching! Chess programs! 128 and 64 DOS! And ready to enter: Screen Sleuth! Escape from Skull Castle! Head-On! Nebergall Run! Wordcount! Crazy Joe!
ISSUE #6—JUNE '84 \$4.00 Game programming column begins! Program generators! Rupert on inputting! Memory management continues! And ready to enter: Post Time for the 64 & VIC! Alpinist! Sound Concept!	ISSUE #13—JAN. '85 \$4.00 VIC/64 OS exposed! Sprites! 1541 device # disconnect switch! Ghostbusters! And ready to enter: Ultra Mail! Music Tutor! Alice in Adventureland! Mid-print! To the Top! Tape/Disk Transfer!	ISSUE #21—SEP. '85 \$4.00 Inside the 1571 drive and 128 keyboard! Sprite programming! And ready to enter: Fastnew! Go-Lister! File Lock! Dragon Type! Superhero! Auto-Gen! Moxey's Porch! Fish Math!	ISSUE #32—AUG '86 \$4.00 Inside the Amiga, part II! Approaching infinity! C-64 war simulations! Pascal for beginners! And ready to enter: Reversi! Highlight! Disk Cataloger! Meteor Run! Trim! Step On It! Flap!
ISSUE #7—JULY '84 \$4.00 MSD dual disk drive! Database buyer's guide! Training your cursor! Screen displays! File Sleuth! Users Groups! And ready to enter: Renumbering! Checklist! Math Defender! Brisk!	ISSUE #14—FEB. '85 \$4.00 Printer interfacing! Multicolor sprites! Modems! Bulletin boards! Theory of game design! And ready to enter: Futurewar! Fontasia! VIC Eraser! Insurance Agent! Flankspeed! Telelink 64!	ISSUE #22—OCT. '85 \$4.00 Create cartoon characters! Infinitesimal intrigue! Inside copy protection! And ready to enter: Shotgun! Maestro! Solitaire! Mystery at Mycroft Mews! Gravinats! 1541 Cleaning Utility! ShadeDump!	ISSUE #33—SEP. '86 \$4.00 Windows and viewpoints! Sound & music on the 64! COMAL! And ready to enter: The Last Ninja! Speech64! Multi RAM! Dogcatcher! Trapped! Matchblocks! Variable Manager! Dual Dump!
ISSUE #8—AUG. '84 \$4.00 Choosing a word processor! Computational wizardry! Creating your own word games! Sound on the 64! And ready to enter: Micro-Minder! Directory Assistance! The Terrible Twins!	ISSUE #15—MAR. '85 \$4.00 Making multiscreen gameboards! Inside the Plus/4! Commodore DOS! And ready to enter: Old Routine! Programmable Functions! Automatic Line Nos.! Home Budget! Salmon Run!	ISSUE #23—NOV. '85 \$4.00 Adventure gaming! ML sprite manipulation! BASIC for beginners! And ready to enter: Lightning Loader! Knight's Tour! Chopper Flight! Rhythmic Bits! Instant Bug Repellent! File Scout! Slither!	ISSUE #34—OCT. '86 \$4.00 Build a digital oscilloscope! ML speed techniques! And ready to enter: Vault of Terror! Quick Change! Penguins! Attack Force! Disk Checkup! Dvorak Keyboard! Mountaineer Mack! 128 Autoboot!
ISSUE #9—SEPT. '84 \$4.00 Program your own text adventure! Build a C-64 cassette interface! Video RAM! And ready to enter: Salvage Diver! DOS! Sound Explorer! The Castle of Darkness! Base Conversions!	ISSUE #16—APR. '85 \$4.00 Assembly language column begins! Programming the joystick! 1541 disk drive alternatives! And ready to enter: Hop Around! Faster 64! Booter! Elecheck! BASIC Trace! Space Hunt!	ISSUE #24—DEC. '85 \$4.00 Speech synthesizers! The IBM Connection! The year's 25 best entertainments! And ready to enter: Gypsy Starship! Directory Manipulator! Cloak! Gameloder! Jewel Quest! Lineout! Santa's Busy Day!	ISSUE #35—NOV. '86 \$4.00 C-128 shadow registers! Data file handling! PROMAL! Habitat! And ready to enter: Teleporter! 128 RAM Check! Discs of Daedalus! Guardian! Tenpins! Syntax Patrol! Deluxe List! Long Lines!
ISSUE #17—MAY '85 \$4.00 Disk drive enhancements! Install a reset switch! Assembler escapades! And ready to enter: Super Duper! Two-Column Directory! DSKDU! Raid! DOS Plus! Font Editor! Tile Time!	ISSUE #18—FEB. '85 \$4.00 Printer interfacing! Multicolor sprites! Modems! Bulletin boards! Theory of game design! And ready to enter: Futurewar! Fontasia! VIC Eraser! Insurance Agent! Flankspeed! Telelink 64!	ISSUE #25—JAN. '86 \$4.00 Build a speech synthesizer! Survey of sports games! And ready to enter: The Martian Monsters! Streamer Font! Microsim! The Haunted Castle! Knockout! Infraraid! Alarm Clock! Memory Check!	ISSUE #36—DEC. '86 \$4.00 File manipulation! C-128 shadow registers! Football games! And ready to enter: The Artist! Minotaur Maze! Mouse in the House! Lazy Source Code! Rebels and Lords! Speedway! The Editor!
ISSUE #19—JULY '85 \$4.00 PROM programming! 3-part harmonies on VIC/64! Speeding pixels! And ready to enter: Auto-Append! Script Analysis! Wizard of Im! Lucky Lottery! Brainframe! Etch! Printat!	ISSUE #20—AUG. '85 \$4.00 Inside the 128! Read-world simulations! Sound effects! And ready to enter: Windows! Formatter! Sound-a-Rama! Screen Dump! Selectachrome! Disintegrator! Fidgets! Gators N Snakes!	ISSUE #26—FEB. '86 \$4.00 Windows! Build an auto-exec cartridge! Align your 1541! Survey of flight simulators! Structured programming! And ready to enter: Arena! Head to Head! Crabfight! Treasure Wheel! Character Dump!	ISSUE #37—JAN. '87 \$4.00 Basic magic! Best games of '86! DOS for beginners! And ready to enter: Vortex! Hanger 14! BASIC Ahoy! Catacombs! Lixter! Dark Fortress! Perma-Line! Starfighter! Bugout! Screens!
ISSUE #21—SEP. '85 \$4.00 Inside the 1571 drive and 128 keyboard! Sprite programming! And ready to enter: Fastnew! Go-Lister! File Lock! Dragon Type! Superhero! Auto-Gen! Moxey's Porch! Fish Math!	ISSUE #22—OCT. '85 \$4.00 Create cartoon characters! Infinitesimal intrigue! Inside copy protection! And ready to enter: Shotgun! Maestro! Solitaire! Mystery at Mycroft Mews! Gravinats! 1541 Cleaning Utility! ShadeDump!	ISSUE #27—MAR. '86 \$4.00 Programming educational games! Memory dumpers! Choosing a copy program! Custom characters! And ready to enter: Ahoy! Term 128! Trivia Game Maker! Brickbusters! Easy Lister! Programmer's Aid!	ISSUE #38—FEB. '87 \$4.00 Hacking into machine language utilities! Amiga RAM expanders! And ready to enter: Window Magic! Crunchman! User Conventions! The Adventurer! More BASIC 128! Jailbreak! Turtle Rescue!
ISSUE #23—NOV. '85 \$4.00 Adventure gaming! ML sprite manipulation! BASIC for beginners! And ready to enter: Lightning Loader! Knight's Tour! Chopper Flight! Rhythmic Bits! Instant Bug Repellent! File Scout! Slither!	ISSUE #24—DEC. '85 \$4.00 Speech synthesizers! The IBM Connection! The year's 25 best entertainments! And ready to enter: Gypsy Starship! Directory Manipulator! Cloak! Gameloder! Jewel Quest! Lineout! Santa's Busy Day!	ISSUE #28—APR. '86 \$4.00 Comet catching! Survey of action and strategy games! Screen dumping! And ready to enter: Chrono-Wedge! Mr. Mystic! Air Rescue! Notemaker! Screen Window! JCALC! Hidden Cavern! Swoop!	ISSUE #39—MAR. '87 \$4.00 Basic esthetics! Survey of video digitizers! Multiplayer games! And ready to enter: C-64 Compressor! Wizard Tag! Turbopoke! Rescue 128! Lights Out! Pinball Arcade! Stow Away! Caverns of Geehonk!

Use coupon or facsimile. If ordering more than three issues, list choices on separate sheet.

If you have a modem and want more complete information on any of the back issues listed, call *Ahoy's* Bulletin Board Service at 718-383-8909.

Ahoy!

BACK ISSUES

ION
INTERNATIONAL INC.
45 West 34th Street
Suite 407
New York, NY 10001

Please Send Me The Following:

____ Copies of issue number ____
____ Copies of issue number ____
____ Copies of issue number ____

NAME

ADDRESS

CITY

STATE

ZIP CODE

Enclosed Please Find My Check or Money Order for \$

(Outside the USA please add \$1.00 for every copy)


```

•140 DATA 20,93,4F,AD,00,02,F0,31,A0,00
•150 DATA B1,2D,85,C2,85,C4,C8,B1,2D,85
•160 DATA C3,85,C5,A9,00,AA,A8,C8,B9,FF
•170 DATA 01,F0,F6,41,C2,81,C2,E6,C2,D0
•180 DATA 02,E6,C3,A5,C2,CD,10,12,D0,E9
•190 DATA A5,C3,CD,11,12,D0,E2,A0,00,68
•200 DATA 91,C4,C8,91,C4,4C,4F,4F,EA
•210 S=5555:FORD=STOS+88:READY$:V=DEC(Y$)
•220 T=T+V:POKE V,NEXT:T=T-11567
•230 PRINT:PRINT:PRINT:POKE 243,9
•240 IF THEN PRINT"?ERROR -CHECK DATA":END
•250 INPUT"PRESS RETURN TO SAVE FILE":Y$
•260 BSAVE"PASSWORD.ML",B0,P (S)TOP (D)
•270 PRINTDS$:END: SAVE IT, NOW!

```

THE MISSING DOS COMMAND

The DOS commands on the C-128 are a very welcome addition to Commodore BASIC. One very helpful command was overlooked: a command that would let you view a sequential file. If you are looking at BBS document files or are writing a program, this command will be very useful.

```
READ#1fn,"filename"[,U device #]
```

You can use the NO-SCROLL key to pause the listing, any key to restart, and the RETURN key to abort the listing.

This command can be used in a program to display instructions or in immediate mode to look at help screens for programming. It will not erase any memory, so you don't lose your basic program.

After running this program you have a file on disk called 'READ#.COM'. You can use BOOT"READ#.COM" or SYS 4864 to start it and SYS 4957 to stop it. The RUN STOP/RESTORE combo doesn't disable it. Add this command to your autoboot start-up routine and it will be there when you need it. —Don Harkness
Andover, KS

```

•100 REM C-128 READ#.BAS
•110 REM BASIC LOADER FOR READ#.COM
•120 FOR X=4864 TO 4968:READ A:POKE X,A:NEXT X
•130 BSAVE"READ#.COM",B0,P4864 TO P4969
•140 NEW
•200 DATA 169,11,141,0,3,169,19,141,1,3,96,224,11,208,23,201,35,208
•210 DATA 19,165,61,233,1,133,38,165,62,233,0,133,39,32,192,3,201,135
•220 DATA 240,3,76,63,77,32,29,161,165,184,141,104,19,32,183,255,41,64
•230 DATA 208,28,173,104,19,170,32,198,255,32,228,255,176,16,32,210,255,32
•240 DATA 204,255,32,228,255,201,13,240,376,49,19,173,104,19,32,195,255
•250 DATA 76,144,175,169,63,141,0,3,169,77,141,1,3,96,0

```

74 AHoy!

ROM BUG

The Commodore 1571 has a bug in ROM. It's more annoying than destroying. If a disk is HEADERED in the double sided mode, and has less than 664 sectors allocated, then validated in the single sided mode (64 mode)...guess what? You come out with a single sided disk. The validation process rewrites a byte on the disk when in single sided mode. If you have programs past sector 664 they will survive, since an illegal track and sector error will occur, stopping the validation procedure. Yet who wants to recopy 70 or so programs to a double sided disk? Not me. So here is a cure. What this program does is change the double-single sided status flag at track 18, sector 0, byte 3 on the disk.

Warning! Use only on disks that have been HEADERED as double sided. If you run this program by mistake on a single sided drive (1541) it will have no effect, since a single sided drive ignores this byte. Be extremely careful when typing in this program; one mistake can trash a disk! Try it on a test disk first...please. —Barri Olson
Madison, WI

```

•10 REM 1571 DOUBLESIDED SAVER - AFTER VALIDATE IN 64 MODE
•20 OPEN15,8,15:OPEN5,8,5,"#":PRINT#15,"U1";5;0;18;0:PRINT#15,"B-P";5;3
•30 PRINT#5,CHR$(128);:REM SET TO 0 FOR SINGLE SIDED- 128 FOR DOUBLE SIDED ***
•40 PRINT#15,"U2";5;0;18;0:PRINT#15,"I0":CLOSE5:CLOSE15

```

BACK TO BASICS

Taking a BASIC program and saving it as a sequential text file has many advantages. Many word processors have features such as SEARCH/REPLACE and FIND, just to name two, that can be used on a BASIC program if saved as a sequential file. Furthermore, editing a sequential text file is usually very easy with WP programs which offer bidirectional scrolling. Still another benefit is the ability to have many small routines (utilities/programs) saved as sequential text files and merging them into one BASIC program. Changing a BASIC program already in memory to a text file requires only two entries:

```

1) OPEN8,8,8,"filename,S,W":CMD8:LIST
2) PRINT#8:CLOSE8

```

(Note: Some WP programs save text files as PRG and not SEQ. If you have one of these WP programs, change the S to P.)

The program below will translate a text file back to BASIC. This program can easily merge text files with any BASIC program in memory. As listed, the program will work with the VIC and 64. But, by changing the value of B (842 for C-128) and K (208 for C-128), it should work on other Commodore computers that have the dynamic keyboard feature (PET,+4,16). Run the pro-

gram (RUN 6) and enter the name of the text file. As the text file is being merged, the lines will appear on the screen. When the program is finished, a SYNTAX ERROR might be displayed, which is natural. After all the routines you want to add have been merged, remember to delete *Back to BASIC*. —Shawn K. Smith
Bronx, NY

```
•66666 INPUT"FILENAME";A$:OPEN8,8,8,A$
•66656 GET#8,A$,A$:REM ID. BACK TO BASIC
•66616 B=631:K=198:POKE152,1:PRINT"[CLEAR
][3"[DOWN]""]
•666125 FORD=1TO6STEP-ST:GET#8,A$:PRINTA$;
•66626 IF A$=CHR$(13) THEN 66646
•66636 NEXT:CLOSE8:END
•66646 FORD=6TO6:POKE6+B,13:NEXT:POKE6,D
•66656 PRINT"[4"[DOWN]""]GOTO66616[HOME]":
END
```

FREE.HELP

For those of you who hate dishing out \$30 for a manual (which you can't understand anyway), here is a real money-saver. Believe it or not, there is a CP/M manual on your CP/M disk already. To get it, type in the following for your appropriate drive and follow the prompts. If you don't have a 1571 you will have to put up with a few pages of garbage at the beginning, but otherwise it is the same as the manual you get if you have a 1571. The reason for this is that the Help.HLP file is 83K, Help.DAT is 82K, and Help.COM is 7K which is over the 170K limit of the 1541. When using the 1571 method, you have to have a disk just formatted in 128 double-sided mode. To get a nicer printout with either drive set your printer to skip-over-perfs.

1541 Disk Drive (with the CP/M disk in drive A)

A> pip 1st:=help.hlp

1571 Disk Drive (with the CP/M disk in drive A)

A> pip e:=a:help.* (E: is the newly formatted disk)

A> help [extract]

A> pip 1st:=help.dat

1571 and Another 1571 or 1541 Drive (with the CP/M disk in drive A: and the newly formatted disk in drive B:)

A> pip b:=a:help.*

A> help [extract]

A> pip 1st:=help.dat

—Paul Reeves
Hamilton, ONT

SILVER SCREEN

Here's a special effect which creates the illusion of an old-time movie reel on your computer screen. This special effect is especially suitable for setting the mood for an arcade game or slide show set in the "silver screen" era. This effect will run in conjunction with BASIC programs and machine code programs that don't alter the IRQ interrupt vector.

After saving a copy of *Silver Screen*, run it. The loader will check for errors in the data and then POKE the

GHOST WRITER 128

—A Word Processor—

\prak-ti-kəl

You know, like edible junk mail.

- RUNS IN C128 "FAST" MODE
- 80-COLUMN WINDOW
- 30,000+ WORD SPELLING-CHECKER
- AUTO-PAGINATION/OPTIONAL AUTO PAGE NUMBERING
- MERGE C64 FILES FROM MOST WORD PROCESSORS AND PRODUCTIVITY PROGRAMS
- MAIL MERGE USING FILES FROM OTHER DATA BASES.
- FORMATS TEXT AUTOMATICALLY AS YOU TYPE
- EASY COPY-MOVE-DELETE COMMANDS.

\ə-'ford-ə-bal

Loosely 'defined' as less than your weekly grocery bill.

39.95

Ask your Local Dealer...

or call us — We love your face.

HesWare • 415-871-0570

390 Swift Ave. #14 • So. San Francisco, Ca. 94080 •

machine language data into memory. (Memory locations 679-740, to be exact.) When you wish the effect to begin, simply enter:

SYS 679

The RUN STOP/RESTORE keys will stop the effect.

Silver Screen is an excellent example of how short, uncomplicated machine code routines can be used to painlessly spice up BASIC programs.

—Bob Ash
Poteau, OK

```

1000 REM *****
1010 REM * SILVER SCREEN, BY BOB ASH *
1020 REM *****
1030 :
1040 REM ** CHECK FOR DATA ENTRY ERROR *
1050 S=0:FOR I=679TO740:READ MC:S=S+MC:N
EXT
1060 IF S <> 5744 THEN PRINT "ERROR IN D
ATA":END
1070 REM ** POKE MC INTO MEMORY **
1080 RESTORE
1090 FOR I1=679 TO 740: READ MC: POKE I1
,MC: NEXT: POKE53281,11
1100 END

```

```

1110 DATA 169, 0, 141, 54, 3, 120, 169,
185, 141, 20, 3
1120 DATA 169, 2, 141, 21, 3, 88, 96, 2
38, 54, 3
1130 DATA 173, 54, 3, 201, 1, 240, 16,
201, 10, 240
1140 DATA 20, 201, 11, 144, 21, 169, 0,
141, 54, 3
1150 DATA 24, 144, 13, 169, 0, 141, 32,
208, 24, 144
1160 DATA 5, 169, 15, 141, 32, 208, 76,
49, 234, 141
1170 DATA 52

```

SPC COMMAND UNLEASHED

If you've done much programming at all on your 64, I am sure you have longed for a command that would print a given number of blank (or reverse) spaces instantly on the screen, to create attractive bar graphs, or blank parts of the screen, or fill boxes with reverse spaces.

On most computers, the SPC command does exactly this. However, on Commodore computers, this only generates a number of cursor rights on the screen, leaving the characters it crosses untouched.

Well, a little gimmick using the Kernal ROM alleviates this problem, and adds a new and very useful command to BASIC.

All you have to do is open a channel to the screen as if it were an output device! Using this method, any SPC command will generate an appropriate number of CHR\$(32)'s, in either REVERSE-ON or REVERSE-OFF.

If you use this command in combination with POS(0), you can compute and print "clear to end of logical line" commands like the C-128's ESC code, or clear parts of the screen and leave the rest intact. It is superior to the Kernal ROM's much-touted clear line routine in that it can be used to clear only a portion of the line it is on.

The short little program below demonstrates use of this command to make attractive, graphically interesting bar graphs almost instantaneously, rather than using FOR-NEXT loops. Note that a REVERSE-ON character must be printed at the beginning of each bar, and a CHR\$(13) to move it to the beginning of the next line.

Make sure that your program closes the channel properly as shown when you want to return to normal screen output.

—Cleveland M. Blakemore
Richmond, VA

```

10 POKE53281,,:POKE53280,,:PRINTCHR$(147
)TAB(10)"EASY BAR GRAPHS!"
20 OPEN1,3:CMD1
30 FORG=1TO18
40 X=RND(1)*38+1:C=RND(1)*14+1
50 POKE646,C
60 PRINTCHR$(145)CHR$(18)SPC(X)CHR$(13)
70 NEXT
80 PRINT#1,""
90 CLOSE1,1

```



COMMODORE-64

SOFTWARE-OF-THE-MONTH CLUB®

(division of O.C.S., Inc.)

We guarantee you'll never again buy useless software for your personal computer.

CLUB MEMBERSHIP OFFERS BIG SAVINGS

NO OBLIGATIONS

When you enroll you will

- Keep only the software that you can use. Examine for a full 10 days; if it's not what you want, return it for a full refund.
- Receive discounts up to 30% on your software choices.

- Be eligible for our Bonus Point Plan—additional discounts applied toward purchases.
- Receive our informative monthly newsletter full of helpful tips for getting the most from your Commodore-64.
- Receive notice of Special Sales where you'll save as much as 50% off list.

The Software-of-the-Month Club is Unique.

No minimum purchases are required—no automatic shipments to you.

Enroll now and receive **absolutely free** Public Domain Software.

Please check ☐ Cassette ☐ Disk

GREAT IDEA! I can't lose. Enroll me now in the Software-of-the-Month Club. I understand there is no obligation. Enclosed is my \$10 membership fee.

☐ Check ☐ Money Order ☐ Bank Card

Name _____

Address _____

City/State/Zip _____

Visa/MC# _____ Expiration date _____

Signature _____

Cut out and mail today to

SOFTWARE-OF-THE-MONTH CLUB
Ohio Computer Services, Inc.
P.O. Box 128723
Cincinnati, Ohio 45212

3

Reader Service No. 145

Turtle Graphics, COMAL, and Logo

By Richard Herring

Take a small step. Turn right a little. Repeat those commands over and over. You have just taken the first step (oops, sorry) in exploring turtle graphics. This column will take you another step.

Turtle geometry differs from other types of geometry in that it is dynamic, or process-oriented. A circle in Cartesian geometry is a set of points that makes an equation come true. A circle in turtle geometry is defined by thinking about what the turtle must do to move along the circle.

Back in 1982, a friend gave me a version of the micro-computer language Logo. He knew I was interested in the educational uses of micros as well as in artificial intelligence. Logo provided a perfect environment to explore those interests.

It was mid-1983 when I finally emerged from my Logo experience. Logo was captivating. It seemed to exist just to make exploring with the computer easy. Logo, which is Greek for "word" or "thought," was developed by Seymour Papert, an educator at MIT who had closely studied the child development theories of Jean Piaget.

Papert had realized that computer languages in the 60s and 70s were designed to be simple for computers, not easy for humans. The fact that early BASICs had a few primitive commands did not make learning to program easy. It meant that you had to write your own routines for many of the commands that we take for granted today. Programming languages were designed to use as little RAM and as few clock cycles as possible.

To avoid those worries, Logo was developed on the most sophisticated computers available and modeled after the AI language LISP (for LIST Processing). As it emerged, Logo found six strengths. First, programs are written in small blocks of code or procedures, as with COMAL and Pascal, rather than in one huge chunk. Second, programming is interactive. Like BASIC or COMAL, as soon as you type a command, the computer obeys it. Interactive languages usually make programming easier, although completed programs may run faster in non-interactive languages.

Third, Logo, like COMAL, is recursive. A procedure can be used as a subprocedure of itself. Recursion is particularly important for describing complicated mathematical problems in simple versions of themselves. Fourth, Logo is extensible, allowing user-defined procedures to be used like primitive commands. Fifth, Logo variables do not have to be declared as string or numeric. Sixth, Logo has list processing to group individual bits of in-

formation into sets. COMAL, like BASIC, uses arrays. A list is often considered more flexible than an array because a list has no fixed size and can contain words, numbers, or even other lists as elements.

Aside from its AI-like lists, the most obvious and intriguing feature of Logo is turtle graphics, a feature conveniently available to all you COMAL programmers. With your indulgence, we will spend the next couple of months exploring with turtles and, in the process, learn something about COMAL graphics.

Turtle graphics are deceptively simple. The turtle ap-

COMAL is required to run the program included with this article. Version 0.14, which will run the program when the indicated modifications are made, can be found on this month's Ahoy! Disk (see page 60).

pears as a triangle on the screen. He has a line from his middle to one corner—his head. The turtle does two things: he moves and he draws. To move him you command FORWARD(x), LEFT(y), or RIGHT(y), where x is the size of his step and y is the number of degrees to turn. Typing FORWARD(20) and LEFT(144) five times will draw a star.

If you want the star to be a particular color, you give the turtle the PENCOLOR(#) command, where # is any of the Commodore color codes from 0 through 15. The PENUP command tells the turtle not to draw as he moves. PENDOWN will tell him to start leaving a trail again.

Let's do a short 45 line program that will show how to set up a turtle graphics screen, give you some idea of the variables to control, and produce some spectacular results. We will use line numbers even though COMAL doesn't require them, so the program is easy to follow.

The program is just three procedures:

```
10) questions
20) setup
30) drawit
```

The "questions" procedure asks you for 7 numbers. You specify the distance you want the turtle to go (line) and the number of degrees he should turn at the end of that distance (angle). You also have the option to increase the

Special Program Notes

1) In the "setup" procedure, line 270 sets the graphics screen to 0 for the standard high resolution bit map mode. The other possible value is 1 for the multicolor bit map mode. The standard mode gives you a screen of 320 horizontal dots by 200 vertical dots, while the multicolor mode only gives you 160 by 200 dots.

But high resolution has a disadvantage if you use the option to have your graphics created in several colors. The standard (hi-res) mode allows only two colors in each 8 by 8 dot section. If a line with a third color crosses through one of those sections, the third color will fill the whole 8 by 8 section. If you want colorful graphics to be sharper, you may actually like the low resolution (multicolor) mode better. It allows up to four colors in each 8 by 8 dot section of the bit mapped screen.

2) Also in line 270, for version 0.14 users, the "setgraphic 0" command will show two text lines on the top of the screen. If you don't want them, you'll have to add a "fullscreen" command at line 275.

3) Lines 270 and 290 prove some of the additional power of version 2.0. In version 0.14 you must set turtlesize before giving the "setgraphic" command or "setgraphic" will kick the turtle back to his maximum size of 10. Version 2.0 doesn't care what order these two commands come in. Also note that the command "hideturtle" is equivalent to turtle-size(0).

4) In lines 70, 90, 110, 130, 150, 170, and 190, we use version 2.0's fancy "input at" command to position the cursor over the default answers in the preceding "print" statements. How and why this works, I'll save for a whole column on getting user inputs.

5) Line 440 is where the procedure "drawit" calls itself. A language is procedural if one procedure can do part of its work by calling another procedure. That language becomes recursive if the procedure can be a subprocedure of itself. Among modern procedural languages, only FORTRAN allows procedures but not recursion. The procedure "drawit" uses tail recursion, where the recursive use of "drawit" is the last thing done in the procedure.

Tail recursion, typically, can be done just as easily iteratively. Iteration means simply telling the computer to execute something repeatedly. BASIC's FOR/NEXT command is a good example. Iteration is often preferred over recursion because, in many implementations of computer languages, it is faster and uses less memory. The interpreter in some newer languages recognizes tail recursion and treats it like iteration.

Recursion, since it can refer to itself, can also refer to itself referring to itself. In human terms this is as complex and fascinating as when you think about thinking. This kind of self-reference finds its roots in the history of philosophy. Remember the Greek paradox about the liar from Crete. If all Cretans lie, but our Cretan says "I'm lying," isn't he really telling the truth?

distance or angle by a specified increment (lineinc or angleinc) during each loop through the "drawit" procedure. You set the screen color (backcolor) and tell the turtle how many different color pens to use (numcolor).

Finally, the questions procedure asks you for the variable "repeat." If you choose to give a non-zero value for "repeat", you will want to use the default values of 0 for line increase and angle increase. "Repeat" increases the length of each line the turtle draws by the original length. This incremental change occurs the number of times you specify in "repeat", then the line length is reset to the original value. "Repeat" merely scratches the surface of the kinds of recursive patterns you can design.

```
40 PROC question
50 PAGE // 0.14=PRINT CHR$(147)
60 PRINT "Starting line length: 40",
65 // 0.14 must delete 'at #,#,#: ""':
70 INPUT at 0,23,5: "": line
80 PRINT "Starting angle size: 144",
90 INPUT at 0,22,5: "": angle
100 PRINT "Increase each line by: 0",
110 INPUT at 0,24,5: "": lineinc
120 PRINT "Increase each angle by: 0",
130 INPUT at 0,25,5: "": angleinc
```

```
140 PRINT "Background color (0-15): 6",
150 INPUT at 0,26,2: "": backcolor
160 PRINT "How many colors (0-15): 1",
170 INPUT at 0,25,2: "": numcolor
180 PRINT "Repeat (0-10,complex): 0",
190 INPUT at 0,24,2: "": repeat
200 ENDPROC questions
```

The second procedure sets up the turtle graphics screen. The "use turtle" command tells the cartridge version of COMAL that turtle instructions are on the way. In version 0.14, it is not necessary to initialize certain command sets with "use", but 0.14 also has far less memory available for your program. Next we clear the turtle's screen and set the screen color. "Home" tells the turtle to move to the center of the screen facing up, though on a new screen like this, that's where he will start anyway. Next we select the high resolution graphics screen to give your artistic creations the best possible resolution.

The "wrap" command connects the bottom of the screen to the top and the left side to the right side to make a two-dimensional globe. If the turtle runs off the top of the screen, you won't have to imagine what his graphics would look like on the wall. Instead, he will reappear

...Announcing

THE
COMMODORE USERS

Ahoy Access Club!



**FREE
TO ALL
SUBSCRIBERS**



An incredible offer from the publishers of *Ahoy!*...The **Ahoy! Access Club**. The **Ahoy! Access Club** offers members: discounts, rebates, coupons on products and services for your Commodore, a Commodore calendar of events, and much, much more! Members will also receive "The Clipper," an exclusive bi-monthly news bulletin. But the best thing about the **Ahoy! Access Club** is that it's **FREE!** to all *Ahoy!* subscribers. Subscribe today! and along with your first issue of *Ahoy!* you'll receive your official **Ahoy! Access Club** membership card...your ticket to super savings and bonuses you can only get from *Ahoy!* Don't miss out on this fantastic offer. The **Ahoy! Access Club**...if you own a Commodore — this club is for you!

THE COMMODORE MAGAZINE THAT OFFERS YOU MORE

on the bottom of the screen. "Turtlesize(#)" specifies how big the turtle (triangle) should be. Our setting of 0 makes the turtle invisible so we won't see him redrawing simple graphics. And finally, we set the initial values for the pen color and the "count" variable used by "repeat".

```
210 PROC setup
220 USE turtle // 0.14 omit
230 clearscreen // 0.14=clear
240 border(backcolor) // 0.14 omit ()
250 background(backcolor) // 0.14 omit ()
260 home
270 graphicscreen(0) // 0.14=SETGRAPHIC 0
280 wrap // 0.14 omit
290 turtlesize(0) // 0.14=omit ()
300 pclr:=1
310 count:=1
320 ENDPROC setup
```

The last procedure, "drawit", does all the real work by calling itself over and over. Note the last command in the procedure (line 440) puts "drawit" in an endless recursive loop. Lines 400-430 just change the color of the turtle's pen as many times as you specified and check that the pen color is not the same as the background screen color. At lines 340-390, the turtle moves forward and turns according to the values you gave.

```
330 PROC drawit
340 forward(line*count)
350 right(angle)
360 count=count+1
370 IF count>repeat THEN count=1
380 line:=line+lineinc
390 angle:=angle+angleinc
400 pencolor(pclr)
410 IF pclr<=numcolor THEN pclr:=pcclr+1
420 IF pclr>numcolor THEN pclr:=1
430 IF pclr=backcolor THEN pclr:=pcclr+1
440 drawit
450 ENDPROC drawit
```

Just to get you started, try some of these sets as inputs to the turtle:

[1,88,1,0,6,1,0]	[12,88,0,0,6,1,5]
(1,180,0,1,9,6,1,0)	[10,144,0,0,6,1,8]
[20,2,0,20,6,1,0]	[10,225,0,0,6,1,10]
(18,40,0,30,6,1,0)	

If you're interested in the educational aspects of computers, and turtles in particular, you might want to check out Papert's book *Mindstorms, Children, Computers, and Powerful Ideas*. Or if you want to know just how complex a critter that little turtle can be, try the book *Turtle Geometry: The Computer as a Medium for Exploring Mathematics* by Abelson & diSessa.

Next month we'll explore more concepts of turtle graphics. We'll also look at some non-turtle COMAL commands that will let us develop a simple joystick drawing program that, through the addition of procedures you can add, might take you to the land of microworlds. □

PROF JONES
SUMMER/FALL 1987

ORDER LINE
(208) 342-6939

THOROUGHBRED
GREYHOUND
HARNESS
LOTTERY/LOTTO
FOOTBALL
BASKETBALL
OFFICE HOURS
M-F 8 AM - 5 PM
SAT 9 AM - 1 PM
(Mountain Standard Time)

FREE CATALOG
1940 W. STATE
BOISE, IDAHO 83702

AMEX

PROFESSIONAL HANDICAPPING SYSTEMS

— PROFESSIONAL SERIES™ —
PROFESSIONAL HANDICAPPING TOOLS FROM PROF. JONES

The New PROFESSIONAL SERIES™ "Software for the Serious Handicapper"

Our all new Professional Series™ represents the most advanced software available for handicapping Thoroughbred, Greyhound, and Harness racing.

- Analysis Module™** \$249.95
The most complete and comprehensive bet analysis package available. This module is fast, powerful and easy to use. Full 50 tracks/kennels/etc. Analyzes race variables and recommends best bet strategies.
- Multiple Regression Module™** \$149.95
Complete control over all program variables. Regresses out factors relating to winning animals and then automatically re-calculates the weighting formula as successive races are analyzed to derive the most precise formula possible!
- Database Management Module™** \$149.95
Automatic storage of last ten races of all animals for inclusion into current race analysis. Higher win percentages due to more information. (\$99.95 if purchased with Multiple Regression Module™).

Other specialized handicapping programs:

LOTTERY:
Advanced statistical analysis programs with proven number selection systems like R, Hard's 6-Digit Permutation, Dimitrov, and others!

- Statistical Lottery Analysis™ \$99.95
- Enhanced Lottery/Lotto Analysis™ \$129.95
- Professional Lottery Analysis™ \$149.95

FOOTBALL:
Complete football statistical prognosis of game scores, points spread, best bet, etc. Win/loss power ratings, previous four game analysis, multiple prediction results, and more!

- Football Predictor™ \$99.95
- Football Addition™ \$149.95
- Professional Series Football™ \$199.95
- Bookie Buster™ Football Analysis \$149.95

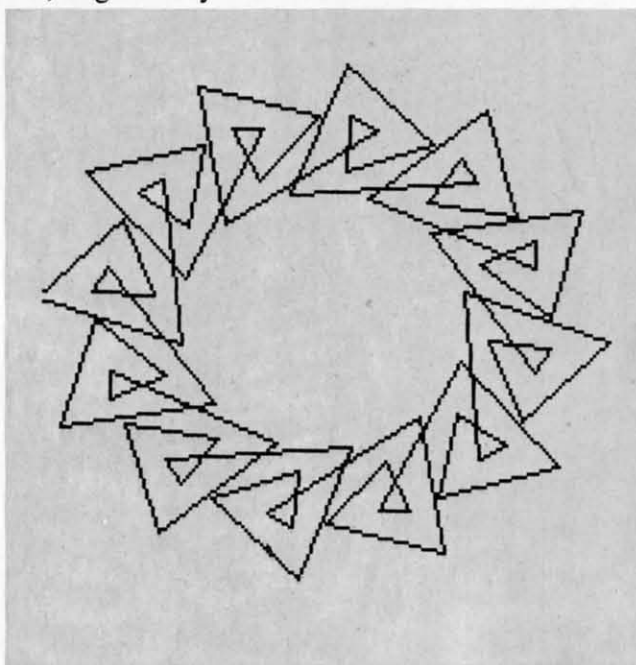
BASKETBALL:
Predict game results based on team strength ratings, past games stats analysis, etc. Evaluates avg. points scored, avg. points given up, wins/losses, point spreads, wild cards, & more!

- NBA Basketball Analysis™ \$99.95
- Basketball Addition™ \$149.95

And many more programs available, call for a copy of our catalog!

Handicapper's Bulletin Board now available. The Prof's NFL & NBA weekly picks! Call for hrs. & Ph. #. / Master Handicapper™ VHS training tapes available. Learn handicapping faster and easier! / Portable PC's w/built-in handicapping software available. Call for more information.

Terms: Free shipping all software. Add \$6.00 COD / \$6.00 UPS Blue / \$9.00 International delivery / ID residents add 5%. Allow 3 weeks when paid by personal check. Prices above are for cash or money order only. Add 3% for Visa, MasterCard, and AMEX. Prices subject to change.



The result of inputting 10,245,00,6,1,6 into the COMAL turtle graphics program provided on these pages.

Commodore Product Potpourri

Hardware, Software & Firmware for your C-64, C-64C, C-128, AMIGA

256-K AMIGA™ MEMORY

It all began 8 years ago when Commodore produced a wondrous PET Computer with 8 Kbytes of memory. Skyles Electric Works then offered to double the PET memory with an 8 Kbyte memory addition.

History repeats itself 7 years later. At 1/3 the price of the original PET memory expansion, Skyles Electric Works now offers 32 times the memory. That's right!! 256 Kbytes of AMIGA memory expansion for only \$79.95*.

Buy your 256 Kbyte AMIGA memory expansion from Skyles Electric Works at the lowest price from the most reliable and most proven Commodore expansion memory builder in the world.

256-K Memory for AMIGA \$79.95*

A panoramic passel of pelucid paragraphs presented by a premier purveyor

MEGABYTES for AMIGA

Available now from Skyles Electric Works.

We had so much fun developing the 256-K Memory for Amiga that we decided to offer 1 Mbyte, and 2 Mbyte, Memories for Amiga. Consider, 1,048,576 or 2,097,152 bytes of memory designed to plug directly into the right side of the Amiga. Each memory board offers full 86 pin buffered pass-thru with Addmem or Auto-config on turn on. We searched America for the best Amiga Memory and found it.

1 Megabyte Amiga Memory \$499.95*

2 Megabyte Amiga Memory \$949.95*

MIDI for AMIGA

A Standard MIDI IN, 2 MIDI OUT, and MIDI THRU Interface for the Amiga Computer.

Plug it into the RS-232 Port on the rear of your Amiga and you are ready to use Musical Instrument Digital Interface (MIDI) instruments and devices with your Amiga. Designed to be used with standard MIDI cables and all the presently available Amiga MIDI software. The MIDI for Amiga Interface gets the job done at a bargain price.

MIDI for Amiga Interface \$49.95*

CLOCK for AMIGA

We Were Shocked When We Discovered

that the otherwise friendly Amiga "would not even give us the time of day". We immediately set about fixing the problem with Clock for Amiga. No longer is it necessary to set the clock via Preferences. With Clock for Amiga you can have the time of day set automatically each time you turn on your Amiga. Clock for Amiga is a small cartridge that plugs onto the 86 pin connector on the right side of your Amiga. Clock for Amiga runs for two years even if your Amiga is turned off. Get Clock for Amiga today and let your Amiga be an amiga.

Clock for Amiga \$79.95*

2 for 1 MONITOR CABLE/C128

The 2 for 1 Monitor Cable allows all composite video monitors to be used with the Commodore 128 in all modes of operation. Don't throw out your present green or amber monitor, buy a 2 for 1 Monitor Cable.

2 for 1 Monitor Cable for C-128 .. \$24.95*



**Skyles
Electric
Works**

1541 FLASH!

The new Skyles Electric Works 1541 FLASH! loads programs and files to your Commodore 64/64C or Commodore 128 (64 mode) three times faster than an unenhanced Commodore 1541 disk drive. 1541 FLASH! saves programs 20 to 50 percent faster. 1541 FLASH! formats a diskette in 25 seconds, a real flash.

The 1541 FLASH! is a permanent hardware installation in your Commodore 64/64C and Commodore 128 (64 mode) and 1541 disk drive. No programs to load, no cartridge hassles.

We have special versions of the 1541 FLASH! for the SX-64 and two 1541s.

In addition to its blinding speed of program and file loading, the 1541 FLASH! adds over 50 extra commands for the Commodore 64/64C/128 user. These include a built-in DOS/Wedge, Easy Editor, and FLASHMON! machine language monitor.

1541 FLASH! C-64/C-64C & 1541 ... \$69.95*

1541 FLASH! C-64/C-64C &

two 1541s \$109.95*

C-128 FLASH! C-128 & 1541 \$79.95*

C-128 FLASH! C-128 &

two 1541s \$119.95*

SX-64 FLASH! SX-64 & 1541 \$69.95*

SX-64 FLASH! SX-64 &

two 1541s \$109.95*

A powerful panoply of pertinent, potent, peripheral products

QUICKSILVER 128

QUICKSILVER 128 our premier IEEE-488

Interface for the Commodore 128 is now in stock and even better than we had planned.

Quicksilver 128 offers an IEEE Interface for the Commodore 128 in the C-128 mode (40 or 80 columns) and in the C-64 mode as well.

QUICKSILVER 128 will inter-connect your Commodore 128 to Commodore SFD 1001, 2031, 2040, 3040, 4040, 8050, 8250, 9060, and 9090 Disk Drives. QUICKSILVER 128 will connect your Commodore 128 to Commodore 2022, 2023, 4022, 4023 and 8023 Printers.

QUICKSILVER 128 C-128 \$119.95*

A priceless programmers pallett of practical products and programs

IEEE Flash! 64

IEEE Flash! 64 our premier IEEE-488

Interface for the Commodore 64 is now in stock and even more transparent (program compatible) than QUICKSILVER 64. IEEE

Flash! 64 will inter-connect your Commodore 64 to Commodore SFD 1001, 2031, 2040, 3040, 4040, 8050, 8250, 9060, and 9090 Disk Drives.

IEEE Flash! 64 will connect your Commodore 64 to Commodore 2022, 2023, 4022, 4023, and 8023 Printers.

IEEE Flash! 64 C-64/C-64C \$99.95*

DRUM MACHINE

Rhythm King is a drum machine for the C-64 and C-128. Rhythm King is a disk and an audio output cartridge that plugs into your C-64 or C-128. Rhythm King has 8 different percussion sounds built-in and Rhythm King will play up to 3 drums at a time. You may write "patterns" of up to 24 bars, with up to 32 notes per bar, with up to 64 steps per note. Up to 64 different patterns may be linked together into a "song", with up to 255 repeats per pattern. Songs may be linked together to form "Megasongs" of up to 255 pattern steps.

RHYTHM KING 128 C-128 \$89.95*

RHYTHM KING 64 C-64 \$89.95*

Prevent and preclude premature pratfalls, by perplexed programming postulants

BASIC PROGRAM COMPILER

BLITZ! is the fastest, easiest to use, most popular, BASIC program compiler available for the Commodore 128, C-64, and C-64C. Your BLITZ! compiled programs will run from 5 to 20 times faster after you BLITZ! them. BLITZ! translates and reduces your BASIC programs in to a much, much faster code.

BLITZ! C-128, Disk \$59.95*

BLITZ! C-64/C-64C, Disk \$59.95*

BASIC PROGRAMMING AID

VICTREE is a BASIC programming aid cartridge for the VIC-20 and C-64/C-64C computer.

VICTREE adds 42 extra commands for BASIC programming ease and full DOS control.

VICTREE commands include CHAIN, EXECUTE, MERGE, SEND, USE, CONCAT, DOPEN, DCLOSE, RECORD, HEADER, COLLECT, BACKUP, COPY, APPEND, DSAVE, DLOAD, DIRECTORY, RENAME, SCRATCH, CATALOG, INITIALIZE, AUTO, DELETE, RENUMBER, MERGE, LCOPY, LMOVE, PRINT USING, FIND, CHANGE, PAGE, HELP, DUMP, and TRACE.

VICTREE 64 Cartridge, C-64/C-64C . \$49.95*

VICTREE 20 Cartridge, VIC-20 \$49.95*

ASSEMBLER CARTRIDGE

If your C-64 programming needs have extended beyond BASIC, Skyles Electric Works now offers MIKRO, a machine language assembler cartridge for the Commodore 64/64C. The MIKRO cartridge contains everything you need for machine language programming.

MIKRO Cartridge, C-64/C-64C \$49.95*

The periodically puzzling, precarious, path to perspicacious program perfection and prowess

INCOME TAX PROGRAM

Taxware, the most comprehensive, easy to use, all year around record keeping and tax preparation system available for the Commodore 64/64C, is now available for the Commodore 128. Better yet, both the improved C-64 and C-128 versions of this popular package are available in one comprehensive package. TaxWare includes forms 1040, 2441, and Schedules A, B, C, D, E, G, W and SE.

TAXWARE, C-64/C64C or C-128, 1541/1571 \$49.95

TO ORDER: Call 1-800-227-9998 or 1-415-965-1735 (CA) or write to:
For More Information: Send Stamped Self Addressed Envelope to:

231-E South Whisman Road, Mountain View, CA 94041

EXTENDED BACKGROUND MODE

For the C-128 By R. Harold Droid

Among the features of Commodore's 40-column graphics (VIC) chip is a text mode called extended background color mode. Not supported by any of the 128's BASIC 7.0 commands, this mode lets you put different background colors behind individual characters. Now you can add those commands yourself and put this "bonus" mode to work in your own programs.

Type in the program. Remember to save it before you run it, as a hedge against disaster. Running the program POKES some code into an unused part of memory and enables the new keywords. You can use this program as a subroutine within your own program, or just experiment with it in direct mode for now. If you do the latter, you can type NEW after running to clear BASIC program memory. The commands stay in the machine until you use the reset button or turn off the computer.

Here are the new commands:

EXTON turns extended background text mode on. Standard C-128 graphic modes are disabled; the GRAPHIC command has no effect while the new mode is active.

EXTOFF turns extended background text mode off and returns to standard text mode (GRAPHIC0).

EXTCOL selects colors. Four different background

colors can be displayed on the screen at any one time. The syntax is

EXTCOL c1, c2, c3, c4

where c1-c4 are standard C-128 40-column color codes (numbers 1-16). Color c1 is the screen background. The system has default values built in if you don't specify otherwise with this command.

EXT switches between the four colors. The syntax is

EXTn

where n is a number from 1-4 that corresponds to colors c1-c4. It defaults to color c1. Once you've chosen a color with EXT, all subsequent PRINT statements print in that background color until you change it with another EXT command.

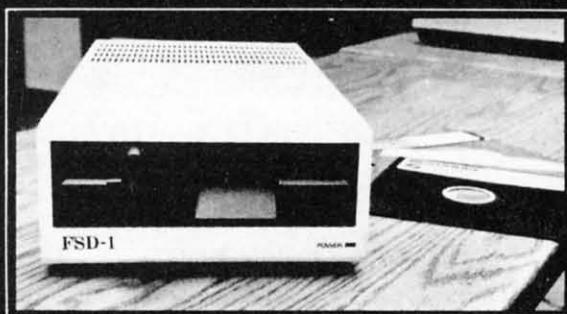
Extended background text mode trades a reduced character set for an increase in background color choices. The normal character set consists of the following subsets of screen codes: screen codes 0-63 are unshifted characters; 64-127 are shifted characters; 128-195, unshifted, reversed characters; 196-255, shifted, reversed characters. Only the first 64 characters can be displayed in extended background color mode. This limits you to numbers, punctuation marks, and unshifted alphabetic characters. Note that the alphabet can be either upper- or lowercase, depending on which character set has been selected with the COMMODORE/SHIFT key combination.

The three higher subsets of screen codes, instead of displaying shifted or reversed characters, now display the three additional background colors. While you're in extended background mode, entering shifted alphabetic or reversed characters from the keyboard may not give you the characters or the colors you would expect. Use the EXT command and limit your PRINT strings to the allowed characters and you've got an easy, predictable way to put extended background mode to work for you in your programs. Standard control characters, such as foreground color changes, CLR and HOME, and cursor movement work normally within your PRINT statements. But except for purely experimental reasons, leave RVS ON and RVS OFF alone.

Some of the effects of extended background color mode are quite novel, like a red cursor printing out white characters, or program listings in multiple colors. Playing around with this in direct mode can be a great way to have a little fun, to gain insight into how the printing routines turn ASCII into screen codes, or to drive yourself crazy. Remember, this mode is recognized by the video display chip—not by the BASIC editor. When you're trying to do some serious editing, use EXTOFF to preserve the normal environment—and your sanity. □

SEE PROGRAM LISTING ON PAGE 105

Commodore Compatible and only... \$149.00



FSD-1 5 1/4" Disk Drive

Directly replaces the Commodore 1541 disk drive.

The FSD-1 Disk Drive is a versatile and efficient disk drive built for the Commodore series of personal computers. This disk drive is fully compatible with the Commodore 64* computer and directly replaces the Commodore 1541 Disk Drive.

Special Features

- Runs all C-64 commercial software
- Ready to run right from the box
- Full 6 month warranty
- Heavy duty construction
- Vented metal chassis
- Built especially for C-64 users

Visa & MasterCard welcome. Credit card orders shipped in 24 hrs. Allow \$12.00 shipping and handling. Send mail order with payment to:

ECI

Emerald Component International
Dept. STNE
541 Willamette Street
Eugene, OR 97401
Tel. 503-683-1154

To Order call toll free
1-800-356-5178

COMMODORE 64 is a registered trademark of Commodore Electronics, Ltd.

Reader Service No. 130

Victimized by Compulsive Gambling?

Today, over 5 million Americans suffer with the addiction of compulsive gambling. Spending house payments in trying to win back losses... borrowing from friends, relatives and employers, even stealing. This disease destroys marriages, careers...entire lives.

Now there's help, hope and a tomorrow for these millions. And, helpful suggestions for those friends and family members close to the gambler who are also suffering, personally or business-wise. A growing dilemma? Yes! Is HELP AVAILABLE? Yes!

***Recovery!* is published monthly in magazine and newsletter form.**

This publication is tailored to help spouses, relatives and employers of known or suspected compulsive gamblers...and the recovering gambler, him or herself.

The information and articles in *Recovery!* can help you understand and help cope with this growing addiction and will be most beneficial to other *related addictions*. Monthly issues offer expert advice on:

- How to help the compulsive gambler stop
- Spotting danger signs in a loved one
- Self-help for the spouse in coping
- How to successfully support and deal with the emotional needs of children in the gambler's family
- True life stories and how the recovery was affected
- Gambling's effect on corporations and businesses
- Financial guidance and investment tips
- Health and fitness for full recovery and relief of stress
- Meeting places, seminars through the U.S. and abroad for both the gambler and spouse
- Current treatment centers
- Correspondence section to exchange ideas across the country
- Toll-Free Hotline Number
- Ideas for constructive substitutions....and much, much more!

Special Corporate Seminars Available Upon Request

YES! Please send FREE
information on helping a
compulsive gambler.

Recovery!
P.O. Box 280
Throggs Neck Station
Bronx, NY 10465-9998

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

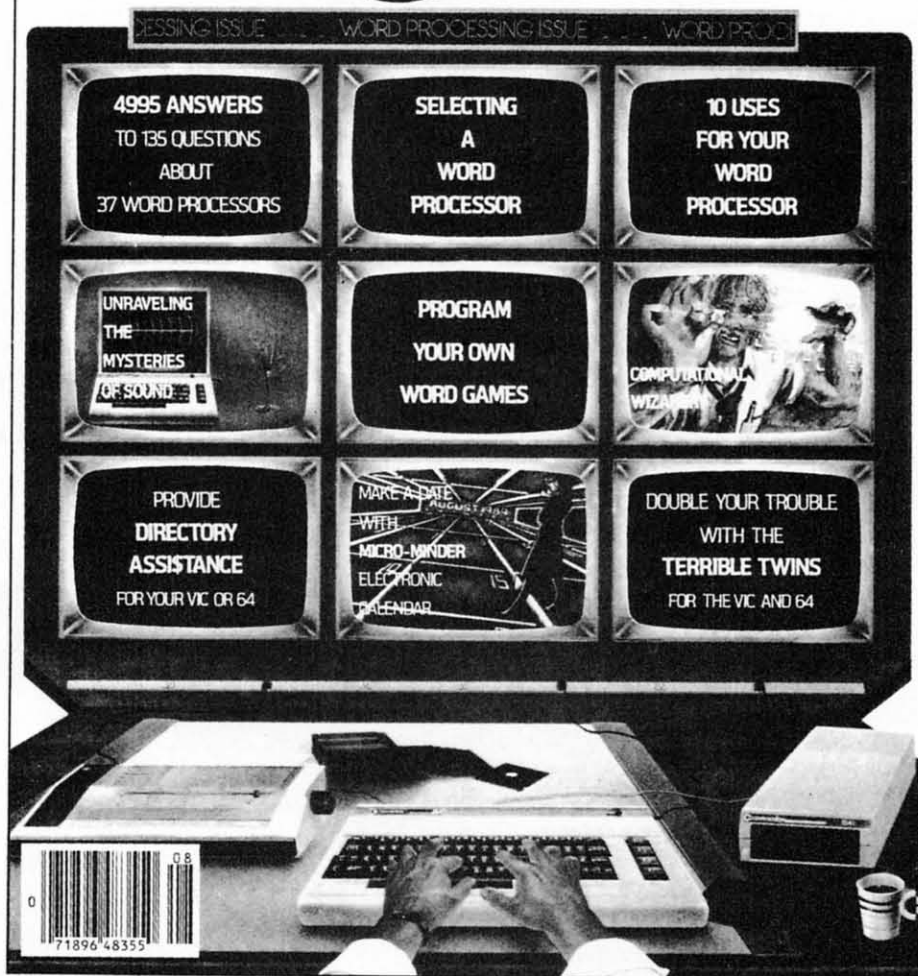
If Applicable: Co. Name _____

Address _____

Employees _____ Company Contact _____

Ahoy!

\$2.50/CAN \$2.75 AUGUST 1984



HAS EVERYTHING!

SUBSCRIBE TO AHOY!

- ☐ Twelve Issues for \$23.00 (\$30.00 Canada and Elsewhere)
☐ Twenty-four Issues for \$44.00 (\$55.00 Canada and Elsewhere)

Name

Address

City State Zip

Send coupon or facsimile to:
ION INTERNATIONAL INC.
 45 West 34th Street, Room 407, New York, NY 10001

LIST FORMATTER

For the C-128

By **Shawn K. Smith**

List *Formatter* is a utility designed for the Commodore 128 which greatly increases the readability of BASIC programs. As the owner of a C-128, you are probably aware that the BASIC editor has an input buffer which allows you to enter BASIC lines of up to 160 characters in length. This is a big improvement over the C-64's capacity of 80 characters per line. The larger buffer means that we can enter twice as much information on a single line. And, since packing multiple commands on one line can actually increase the speed of BASIC program execution, programmers are taking full advantage of the input buffer. Unfortunately, however, this quest for increased speed has produced a predicament. Many programmers find themselves asking, "Should I throw readability out the window and settle for the increased speed?" My answer is simple. NO! Use *List Formatter* and get the best of both worlds.

List Formatter is a short machine language program in the form of a BASIC loader. There are no special instructions for typing in the program. Enter it as you would any BASIC program, but pay close attention to the DATA statements which contain the ML code. After you've typed in the program, save a copy. When you run it, the ML is POKEd into a safe area of RAM which is determined by the value of the variable S. If you wish, you can have the program relocated by changing the value of S in line 110 before you run it. Next, the program is activated, the SYS to turn it on/off is displayed, and the loader is erased from memory.

Now that *List Formatter* has been patched into the IQPLOP vector (306-307), which is responsible for listing BASIC text, we are able to control the way BASIC lines are listed. (It should be noted that the LIST command has not been changed, only the format of the listing.) Since the only way to place multiple statements on a line is to use a colon, *List Formatter* first checks for colons. When a colon is encountered, the program makes sure that the colon is not within quotes. If this turns out to be true, a carriage return and a calculated number of spaces are printed to produce a uniform output. Likewise, in keeping with readability, all REMs are displayed in reverse video! As an example, consider listing the following BASIC line:

```
200 GOSUB500:DO:READY: IF Y<0THEN  
EXIT:ELSE:PRINT#8,CHR$(Y)+" ":"":LOOP:REM  
STORE DATA TO DISK!"
```

With the standard list routine, the line would list as is.

However, with *List Formatter* the listing becomes

```
200 GOSUB500  
:DO  
:READY  
: IF Y<0THEN EXIT  
:ELSE PRINT#8,CHR$(Y)+" ":"";  
:LOOP  
:REM STORE DATA TO DISK!
```

This format is ideal for examining programs, or as a final draft of your program. But do not attempt to edit a line in this format. If you must edit a line, temporarily turn off *List Formatter* and relist the line. Removing the REM from the beginning of line 350 in the BASIC loader will turn the f5 function key into an on/off switch for *List Formatter*.

I hope this program proves to be as beneficial for you as it has for me. □

SEE PROGRAM LISTING ON PAGE 113

RENTING: THE ART OF SPENDING A LITTLE TO SAVE A LOT!

At Wedgwood Rental we have made renting software an art. We have over 500 titles for the C-64, C-128, and Amiga Computers. By spending a little to rent you can use the latest software to find the programs you like. Then purchase only those used programs you know you want at less than retail prices.
CALL TODAY FOR A LIST!

Call toll-free outside Texas: 1-800-433-2938
— Inside Texas call: 817-292-7396



WEDGWOOD RENTAL
5316 Woodway Drive
Fort Worth, Texas 76133



Reader Service No. 126

COMMODARIES

PROGRAMMING CHALLENGES

By Dale Rupert

Each month, we'll present several challenges designed to stimulate your synapses and toggle the bits in your cerebral random access memory. We invite you to send your solutions to:

Commodares, c/o Ahoy!
P.O. Box 723
Bethel, CT 06801

We will print and discuss the cleverest, simplest, shortest, most interesting and/or most unusual solutions. Be sure to identify the *name* and *number* of the problems you are solving. Also show sample runs if possible. Be sure to tell what makes your solutions unique or interesting, if they are.

Programs on diskette (1541 format only) are welcome, but they must be accompanied by listings. You must enclose a stamped, self-addressed envelope if you want any of your materials returned. Solutions received by the middle of the month shown on the magazine cover are most likely to be discussed, but you may send solutions and comments any time. Your original programming problems, suggestions, and ideas are equally welcome. The best ones will become *Commodares*!

PROBLEM #40-1: SMALL STRAIGHT

This problem was submitted by Steven Steckler (Columbia, MD). In his Yahtzee game program, Steven randomly tosses five dice and then tests for a small straight. For this program, small straight means that at least four of the five dice can be arranged to be in numerical order.

For example, a toss of 61534 represents a small straight since there is a "3456" sequence among them. Also 53542 contains "2345", 41342 contains "1234", and 51234 contains both "1234" and "2345." How easily can you simulate the throw of five dice and identify those throws which contain one or more small straights?

PROBLEM #40-2: SHORT SORT

Chris Raimondi (Kingsville, MD) needs a program in which the user enters six numbers and the computer prints them out in numerical order. Disregarding the input statement, can you program the sorting routine in just one line? If not, send your shortest routine anyway.

PROBLEM #40-3: POLYGON PLAY

Nolan Whitaker (Jeffersonville, KY) suggested this geometrical challenge. The user enters the number of sides of a regular convex polygon (3 is an equilateral triangle, 4 is a square, 5 is a regular pentagon, and so on). The

program responds with the size of each interior angle, the sum of its interior angles, the area of the polygon, the radius of an inscribed circle, and the radius of a circumscribed circle, assuming each side of the polygon has a length of one meter.

PROBLEM #40-4: INTEGER FUNCTIONS

Create user-defined functions FNF(X) and FNC(X) which determine the floor function and the ceiling function of any input value X. The floor function of X is defined as the greatest integer less than or equal to X. The ceiling function of X is the least integer greater than or equal to X. For example if X is 3.5, FNF(X) is 3, while FNC(X) is 4. If X is -3.5, FNF(X) is -4, and FNC(X) is -3. Let's see some solutions from you first-timers.

This month we will look at the most interesting solutions to *Commodares* from the December 1986 issue. One tip and a suggestion first. If you send a disk (1541 format only), be sure to pack it between pieces of cardboard or put it in a special disk mailer. Also mark the outside of the package "Please Do Not Bend."

The reason for this warning is that my mailbox often fills to overflowing, and sometimes the larger envelopes are folded to fit in. The envelopes properly labeled are usually left flat, and the disks in them tend to work much better than those with a crease down the middle. Remember to send packaging and return postage if you want any materials returned. (With prices of disks below \$1 these days, the return postage is usually more than the disk. It's your option.)

Now for the tip. If a damaged disk does not rotate freely in its jacket (such as those I receive with creases), it is still possible to salvage the data on it. Carefully open the jacket at one end and slip the disk out (touch the edges, not the writing surfaces). Remove the inner disk from another diskette which has a good jacket and replace it with the disk from the damaged jacket (be sure it is right side up). Now you can read and copy the files from the damaged disk.

One final note. Amazingly enough, some disk drives which are not spring-loaded allow the inner disk itself to be inserted and read even *without* its jacket. (This is not a recommended procedure, of course, but it works.) The spring-loaded drives such as the 1541 and most other half-height drives require the strength of the jacket to cock the spring before the disk can be inserted, however. Enough for disk trivia.

Determining the 2,568 digits of 1000 factorial (1000!) was the challenge from *Problem #36-1: Fancy Factorials*

Why Are We Giving Away Such Famous Nationally Advertised First Quality Designer Jeans As

★ Calvin Klein ★ Jordache ★ Sasson
each pair for **\$1** **SUPER DISCOUNT COUPON**
only a everytime you buy another pair at our regular
low retail price? Currently only \$28 a pair.

Until midnight June 25, 1987 — we will give
you these booklets of ten \$1 coupons for only

\$10

Per Booklet
Of Ten
\$1
Coupons
Good for any 10
Famous Designer
Jeans. Values of
\$280 or more!

- Super Discount Coupons Are Guaranteed Redeemable One-By-One Or As Many As You Like At A Time.
- No Need To Use Up Your Coupons All At Once, If You Don't Want To — Coupons Are Redeemable Until January 10, 1989.

As part of a nationwide publicity campaign, an innovatively bold, pioneering North Carolina firm will give away one million (1,000,000) Guaranteed Super Discount Famous Designer Jeans Coupons Booklets for the Shocking Publicity Price of only \$10 a booklet to every person who reads this publicity campaign ad and writes to the company address (below) before midnight, June 25, 1987.

You absolutely must send this Original Publicity ad along with your request. No copies or Photostats accepted.

Please note that — even though the company's astonishing price of \$10 per coupons booklet will expire on the above mentioned June 25, 1987 date — however, you will be allowed a much longer time period to redeem your super Discount Famous Designer Jeans Coupons. A \$280.00 value.

The company guarantees that it will promptly, redeem all coupons sent in for redemption — all the way up until January 10, 1989. That's plenty of time for you to use up all your coupons. Also you are permitted to transfer your coupons to someone else to redeem, if you wish. These Super Discount Coupons make excellent gifts too.

Each Super Discount Coupons Booklet contains 10 coupons, which can be redeemed for 10 pairs of the famous nationally advertised Calvin Klein, Jordache and Sasson Designer Jeans. No seconds, or irregulars. All are new first quality designer jeans that sell for up to \$40 or more at many local stores.

These are the same popular, nationally advertised Designer Jeans Super Discount Coupons Booklets you may have already heard about.

Now, you can own all the fashionable, designer name jeans, that you want. You too can enjoy the fabulous savings that Super Discount Coupons bring.

Don't risk missing out by responding too late! These are the fastest selling, and most sought-after Super Discount famous Designer Jeans Coupons ever sold by this most enterprising North Carolina firm.

These popular, Nationally Advertised Super Discount Jeans Coupons will not be sold at this price by the company in any store. There is a limit of just Two (2) booklets per address at this price, but if your request is sent early enough (before June 10) you are allowed to request up to 5. Each booklet is strongly backed by the company's full one-year money-back guarantee.

To order your Guaranteed Famous Designer Jeans Super Discount Coupons mail this entire original publicity ad (no copies or photostats accepted) along with your name and address and \$10 for each Coupons booklet. Add only \$1 shipping per booklet ordered (North Carolina residents add sales tax.) Allow up to 3 to 5 weeks for shipment. Make check payable to Designer Jeans Clearinghouse.

Mail to Designer Jeans Coupons Booklets, Dept. AM-2, 110 West 5th Street, Winston-Salem, North Carolina 27101.

Don't forget — This Amazing Low Price Offer Expires June 25, 1987 To Readers Of This Publication.

Just try finding such famous nationally advertised Designer Jeans in any store anywhere — at the astonishingly low price of only \$1 each! Just a mere \$10 for a booklet that's redeemable for 10 pairs of famous Designer Jeans ... a value of \$280 or more!

NATIONALLY ADVERTISED DESIGNER JEANS
NEW SUPER DISCOUNT COUPONS BOOKLETS OFFERING
AMERICA'S MOST SOUGHT-AFTER FAMOUS NAMES DESIGNER JEANS
CALVIN KLEIN ★ JORDACHE ★ SASSON



JUST \$1
YOU SAVE BIG! PLUS THEY MAKE PERFECT GIFTS!

suggested by Jim Speers (Niles, MI). Several readers met the challenge. N factorial is the product of all integers from 1 up to and including N. $5!$ is $5*4*3*2*1$ or 120 (not 720 as given in the original example). As David Hoffner (Brooklyn, NY) pointed out, the challenge was not so much the calculation, but where to fit the digits in the computer. David used two arrays to store the digits. The following program is a collection of several solutions to the problem.

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-1 :
3 REM   FANCY FACTORIALS
4 REM
90 REM-----SOLUTION BY MATT SHAPIRO-----
100 H=100000:E=.0000001:I=0:J=0:K=1:C=0:
   P=0:N=0:DIMF(3000):F(1)=1:INPUT"N";N
110 FOR I=1 TO N:FOR J=1 TO K:P=I*F(J)+C
   :C=INT(P/H+E):F(J)=P-H*C:NEXT
120 IF C THEN K=K+1 : F(K)=C : C=0
130 NEXT:PRINT MID$(STR$(N),2)"!="MID$(S
   TR$(F(K)),2);
140 IFK>1THENFORJ=K-1TO1STEP-1:PRINTRIGH
   T$("[4"0"]"+MID$(STR$(F(J)),2),5);:NEXT
150 END
190 REM-----SOLUTION BY ROB SCHULTZ-----
200 INPUT "N";N : M=1
210 FOR J=1 TO N : M=M*J
220 IF M>=10 THEN M=M/10 :E=E+1:GOTO 220
230 NEXT : PRINT M "E+" E
240 END
290 REM-----SOLUTION BY CHARLES KLUEPFEL---
300 INPUT "N";N : PRINT N"[LEFT]!" = ";
310 LN=LOG(N)*(N+.5)-N+LOG(2*[PI])/2+1/(
   12*N)-1/(360*N*N*N)
320 LN=LN+1/(1260*N*N*N*N*N)-1/(1680*N*N*
   *N*N*N*N*N)
330 IF N<12 THEN PRINT INT(EXP(LN)+.5) :
   GOTO 360
340 LG=LN/LOG(10) : CH=INT(LG) :MN=LG-CH
350 PRINT LEFT$(STR$(EXP(MN*LOG(10)))+"[
   10"0"]",12-LEN(STR$(CH)));"E" MID$(STR$(C
   H),2)
360 END
390 REM-----STIRLING'S FORMULA-----
400 INPUT "SPECIFY N LESS THAN 34";N
410 NF=SQR(2*[PI]*N)*(N/EXP(1))[UPARROW]
   N
420 PRINT N "!" >" NF
430 PRINT N "!" <" NF*(1+1/(12*N-1))
440 END

```

The first solution in lines 100 through 140 is from Matt Shapiro (Fort Lee, NJ). It is the only exact solution given here. Wait long enough and all 2568 digits of 1000! will eventually be printed. Matt mentioned that the program can calculate up to 4640! using the F array of 3000 elements.

The next solution from Rob Schultz (Fremont, CA) in lines 200 through 230 is not exact. It keeps track of the mantissa (M) and the exponent (E) of the answer separately. After each multiplication, factors of ten are removed from the product in line 220 and added to the exponent. That way the product stays small and exact up to nine digits. This program is faster than the exact one, but it still takes a while since N multiplications must be performed. Type RUN 200 to use this program.

The third program is from Charles Kluepfel (Bloomfield, NJ). It is less accurate than the previous two, but it is much faster. It uses a series approximation for the factorial function. Use this program to get values quickly even beyond 90,000! (That's a big number by the way.) Type RUN 300 for this program.

The fourth program has the advantage of being very short and fast, but it handles the smallest range of integers (N must be less than 34). This program uses Stirling's formula which is primarily used for approximating large factorials. Unfortunately in our computer, large factorials cause an overflow error. If you need a short function and an approximate value for small factorials, the formulas in lines 420 and 430 give lower and upper limits on the result. Type RUN 400 and enter a number less than 34 for this program.

Thanks also to Mario Segal (Mexico City, Mexico), Carl Stolberg (Traverse City, MI), Wm. G. James (Dunchurch, ONT), Clifford Dedmore (North Bend, OR), and Jack Baldrige (Boulder, CO). Jack sent COMAL and BASIC solutions with some timing analysis. His times to calculate 100! for BASIC, COMAL 0.14, COMAL 2.0, and compiled BASIC using the same algorithm were 78 seconds, 63 seconds, 35 seconds, and 24 seconds respectively. Jack said he wrote the program originally in COMAL 2.0 because of its structured logic and ease of modification.

There were at least two general approaches to *Problem #36-2: Animated Expansion*. The problem was to show an input word being expanded on the screen by inserting a specified number of spaces, one by one, between its letters. The one-liner below from Clifford Dedmore (North Bend, OR) performs the task by using the insert character CHR\$(148).

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-2 :
3 REM   ANIMATED EXPANSION
4 REM   SOLUTION BY
5 REM   CLIFFORD DEDMORE
6 REM =====
10 INPUTW$,N:PRINT"[CLEAR]"W$"[HOME]"[RIG
   HT]";:FORT=1TOLEN(W$):FORK=1TON:PRINTCHR
   $(148)" ";:NEXT:PRINT"[RIGHT]";:NEXT

```

Specify the string and the number of spaces to be put between each letter, then watch it fly.

Another version of the program from Andre Lessard (Shawinigan-sud, Quebec) is listed below.


```

1 REM =====
2 REM   COMMODARES PROBLEM #36-2 :
3 REM   ANIMATED EXPANSION
4 REM   SOLUTION BY
5 REM   ANDRE LESSARD
6 REM =====
10 INPUT"[CLEAR]ENTER A WORD";A$:INPUT"ENTER A NUMBER";A:PRINT"[HOME][3][DOWN]"
   "A$
20 CR$=CHR$(148):B=1:C=LEN(A$)-1:X=1:Y=C
   :Z=1:DEF FNB(A)=B+A+1 : GOSUB 40
30 CR$=CHR$(20):B=C+2+C*A:X=C:Y=0:Z=-1:D
   EF FNB(A)=B-A-1 : GOSUB 40 : GOTO 20
40 FOR J=X TO Y STEP Z : FOR K=1 TO A :
   PRINT"[HOME][3][DOWN]"TAB(B)CR$ : NEXT
50 B=FNB(A) : NEXT : RETURN

```

Andre's program sets up variables to expand the string in line 20 and variables to contract the string in line 30. The subroutine at line 40 performs both operations. This program also uses the "insert" character CHR\$(148) to add spaces to the screen and the "delete" character CHR\$(20) to delete them.

A different approach is shown in this program by Bing Perry (Monterey, CA).

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-2 :
3 REM   ANIMATED EXPANSION
4 REM   SOLUTION BY
5 REM   BING PERRY
6 REM =====
10 INPUT"[CLEAR]ENTER NUMBER OF SPACES";
   S
20 INPUT"ENTER WORD";A$ : L=LEN(A$)
30 PRINT "[CLEAR]"A$ : GOSUB 100 : FOR K
   =1 TO L-1
40 FOR J=1 TO S : A$=LEFT$(A$,(K-1)*(S+1
   )+J)+". "+RIGHT$(A$,L-K):PRINT"[HOME]"A$
50 GOSUB 100 : NEXT : NEXT
60 FOR K=L-1 TO 1 STEP -1
70 FOR J=S TO 1 STEP -1 : A$=LEFT$(A$,(K
   -1)*(S+1)+J)+RIGHT$(A$,L-K)
80 PRINT"[HOME]"A$+" ":GOSUB 100 :NEXT
   :NEXT
90 END
100 FOR T=1 TO 20 : NEXT : RETURN

```

Bing's program creates a different string value for each stage of the expansion or compression. The advantage of building strings rather than merely using the screen insert character is that characters other than spaces may now be used for the expansion. Change the "." character in line 40 to any other character and see the results. You can adjust the speed of operation by changing the 20 in line 100 to any other value.

Jim Speers (Niles, MI) sent some interesting applications along with his solution listed below.

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-2 :
3 REM   ANIMATED EXPANSION
4 REM   SOLUTION BY
5 REM   JIM SPEERS
6 REM =====
100 FOR I=1 TO 40:B$=B$+" ":NEXT I
110 INPUT"[CLEAR][DOWN]ENTER TEXT";W$
120 INPUT"[DOWN]# OF SPACES";N:PRINT"[CL
   EAR]"
130 REM N=3 : W$=" QB JO LD TURFUVTAO HI
   OOMEHZG ECWXPRESY KN S"
140 REM N=1 : W$="[6" "][RVSON]M[RVSON]E
   [RVSON]N[RVSON]U[RVSON]"
150 REM N=7 : W$="1 4 52+5=73 6 9"
160 REM N=7 : W$=" M[4" " ]O H NDO TAU
   HYR [3"[c T]" ]"
170 K=1 : GOSUB 210
180 FOR I=1 TO N:GOSUB 220 : PRINT P1$LE
   FT$(B$,I)P2$:FORJ=1TO1:NEXTJ:NEXTI
190 W$=P1$+LEFT$(B$,N)+P2$:K=LEN(P1$)+N+
   1:GOSUB210:IF P2$="" THEN END
200 GOTO 180
210 P1$=LEFT$(W$,K):P2$=MID$(W$,K+1,255)
   :RETURN
220 IF DS$="" THEN POKE 780,0:POKE 781,1
   :POKE 782,0 : SYS 65520 : RETURN
230 SYS 65520,0,1,0 : RETURN

```

Remove the REM from the beginning of line 130 and just press RETURN in response to the two prompts. To see the other examples, remove the REMs from lines 140 through 160 one at a time and run each one. Line 220 is for the C-64 to call the PLOT Kernal routine so the cursor always starts at row 1 column 0 (the second and third POKEs are the row and column numbers). Line 230 does the same thing for the C-128. Recall that DS\$ has special meaning for the C-128 (disk status), but it is just a null string for the C-64. You can adjust the speed

Call Ahoy!'s Bulletin Board System

If you have a modem, you can call Ahoy!'s Bulletin Board System at 718-383-8909 any hour of the day, any day of the week to exchange electronic mail with other Commodore users and download files like:

- Editorial calendar for upcoming issues
- Excerpts from future news sections
- Corrections to programs/articles
- Detailed descriptions of back issues

Set your modem for 300/1200 baud, full duplex, no parity, 1 stop bit, and 8-bit word length. (Multiuser access to the Ahoy! BBS is available on the PlayNET Bulletin Board System.)

with the values in the J loop in line 180. Jim's examples work with a 40-column screen.

Solutions to this problem and others came from these readers: Curt D'Onofrio (Shelton, CT), Sol Katz (Lake-wood, CO), Sixto Santos, Jerry Torres (Daggett, CA), Ivan Rudyk (Burlington, ONT), Brian Carr (Hermitage, TN), Stephane Edwardson (La Tuque, QUE), Karen Middaugh (San Diego, CA), Steve Schowiak (Giessen, W. Germany), David Embry (San Diego, CA), and Ed Hoofnagle (Cove, OR).

Problem #36-3: Life Times suggested by Bill Okerblom (Providence, RI) convinced quite a few readers that you don't have to be a super-powered programming expert to solve *Commodares* (although it may help in some cases). The user enters his age. The program then displays the dates of the previous 100 lifetimes of the user. The idea here is to show historical times from a different perspective.

The following solution from Rick Needham (Croton-on-Hudson, NY) easily meets the requirements of the problem.

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-3 :
3 REM   LIFE TIMES
4 REM   SOLUTION BY
5 REM   RICK NEEDHAM
6 REM =====
7 INPUT "AGE";A: FOR X=1 TO 100: Y=1987
8 -A*X : IF Y<=0 THEN Y=Y*-1+1 : A$="BC"
9 PRINT X,Y;A$: NEXT : END

```

Enter your age at the prompt. The program then shows the year one lifetime ago. It should be your birth year (or one year later if you haven't had a birthday yet this year). It also shows the other previous years. Rick's program handles the B.C. years properly (there was no 0 B.C.) with the IF-THEN statement.

Lon Olson (Mesa, AZ) used some fancy looping and logic on the C-128 and fit the program into one line as follows:

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-3 :
3 REM   LIFE TIMES
4 REM   SOLUTION BY
5 REM   LON OLSON
6 REM =====
7 INPUT"[CLEAR][DOWN][DOWN]AGE=";A:Y=19
8 87:DO:I=I+1:Y=Y-A:IFI>100THENSTOP:ELSEIF
9 Y<=0THENEXIT:ELSEPRINTI)"Y:LOOP:Y=1+AB
10 S(Y):DOUNTILI>100:PRINTI)"Y"BC":Y=Y+A:
11 I=I+1:LOOP

```

By cleverly using a logical variable as an array index, Clifford Dedmore (North Bend, OR) fit his solution into one line also. Enter the current year and your age into this program.

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-3 :
3 REM   LIFE TIMES
4 REM   SOLUTION BY
5 REM   CLIFFORD DEDMORE
6 REM =====
7 T$(1)="BC":INPUTY,A:FORK=1TO100:Y=Y-A
8 :PRINTK,ABS(Y)-(Y<1);T$(-(Y<1)):NEXT

```

The expression $(Y < 1)$ has a value of -1 (true) if Y is less than 1 and a value of 0 (false) otherwise. For A.D. years, $(Y < 1)$ is zero. T(0)$ is the null string. For B.C. years, $(Y < 1)$ is -1 . Consequently the B.C. years are properly corrected, and T(1)$ which is "BC" is printed.

Congratulations to these readers for solutions to this problem: Carlos Centeno (Lares, PR), L. W. Brenne-man (Erie, PA), Stephen Rasmussen (Nacogdoches, TX), Ben Medich (Weehawken, NJ), Jorge Milke (Mexico City, Mexico), Jonathan Davis—let's hear it for Kid Pow-er! (Henderson, KY), Karen Middaugh (San Diego, CA), James Bauer (Portland, OR), Mario Segal (Mexico City, Mexico), Ronald Weiner (Levittown, PA), Jim Speers (Niles, MI), and Paul Sobolik (Pittsburgh, PA).

Problem #36-4: Crossed Ladders brought out the best of the geometers, trigonometricians, and numerical analysts. There are two ladders leaning against buildings on opposite sides of a street, each ladder going from the base of one building to the wall of the other. The lad-ders are 20 and 30 feet long and their point of intersec-tion is 6 feet above the street. The problem is to find out the width of the street.

Several readers mentioned that the problem can be solved algebraically, but they were equally quick to add that solving it is a very hard task. The procedure is then to set up the equations, and let the computer solve them.

Let the width of the street be X and the heights of the two ladders against the buildings be HS and HL for the short and long ladders, respectively. HS and HL can be determined from the Pythagorean Theorem to be:

$$HS = \sqrt{20^2 - X^2}$$

$$HL = \sqrt{30^2 - X^2}$$

It can be shown from properties of similar triangles or with trigonometric relations (and some algebraic manip-ulations) that the height of the intersection of the lad-ders above the street HX is:

$$HX = \frac{(HS * HL)}{(HS + HL)}$$

Now you can write a program which repeatedly incre-ments X . For each value of X , the program evaluates HS , HL , and HX . The value of X for which HX has a value of 6 is the answer. The size of the X increments determines the accuracy of your result.

15 SUCCESS MANUALS that could solve your money problems once and for all!

FASTEST, EASIEST ... PROVEN PROFITABLE BUSINESSES YOU CAN QUICKLY START AND OPERATE FROM HOME WITH LOW OR NO CAPITAL ... PART TIME OR FULL TIME...

No experience required ... Nothing complicated to study ... Strictly legal and honest ...

Each beginners Success Manual is Guaranteed to teach you everything you need to know to succeed fast! The perfect answer for ambitious men and women ...

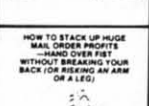
1. FIFTY QUICK, EASY AND MOST UNUSUAL WAYS TO POCKET "GIANT DOLLARS!"

Here's your chance to discover how so many folks miss out on numerous opportunities to pull in some big, fast cash. A most unique money-opportunity book which quickly shows you how just ordinary men and women from all walks of life are building spare time and full time fortunes; plus home businesses, money secrets, wealth-building methods, out-of-the-ordinary plans and odd blue prints to success, plus more. (only \$6.95)

FIFTY QUICK, EASY AND MOST UNUSUAL WAYS TO POCKET "GIANT DOLLARS!"



HOW TO STACK UP HUGE MAIL ORDER PROFITS — HAND OVER FIST WITHOUT BREAKING YOUR BACK (OR RISKING AN ARM OR A LEG)



HOW TO SEW YOUR WAY TO PRETTY PROFITS FAST!



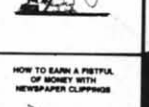
HOW TO TURN YOUR TELEPHONE INTO A MONEY MAKING MACHINE



HOW TO EARN A FISTFUL OF MONEY WITH NEWSPAPER CLIPPINGS



HOW REAL ESTATE CAN MAKE YOU A FORTUNE — USING OTHER "FOLKS MONEY"



THE AMAZING HOME WORKER'S WORK-AT-HOME SUCCESS GUIDE (For Men and Women)



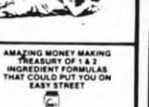
AMAZING MONEY MAKING TREASURY OF 1 & 2 INGREDIENT FORMULAS THAT COULD PUT YOU ON EASY STREET



WORLD'S EASIEST MOST PROFITABLE MAIL ORDER BUSINESS



TWELVE SIMPLE LITTLE-KNOWN WAYS TO MAKE BIG MONEY FAST!



11. HOW TO SIT BACK AND RAKE IN A BUNDLE SELLING BOOKS BY MAIL:

Practically all mail order experts agree that absolutely nothing sells better by mail than books ... and there's nothing that sells easier than books. Better yet — you stand to make bigger and faster net profits from selling books by mail than you could realize on any other items. You will be shown everything from A to Z. (only \$6.95)

HOW TO SIT BACK AND RAKE IN A BUNDLE SELLING BOOKS BY MAIL



HOW TO WIN BIG CASH AND VALUABLE PRIZES CONTESTS



BIG FAST FULL TIME AND PART TIME PROFITS FOR WOMEN



EASIEST AND FASTEST WAY TO START A SUCCESSFUL MAIL ORDER BUSINESS ON A SHOESTRING



HOW TO SEE THE WORLD TRAVEL AND GET PAID WELL FOR IT



12. HOW TO WIN BIG CASH AND VALUABLE PRIZES CONTESTS:

This unique book quickly shows you all the important inside tricks. Opportunity to win national and local contests again and again. Cash, cars, homes, appliances, furs and vacations ... No other publication on the market exactly like it. (only \$6.95)

13. BIG FAST FULL TIME AND PART TIME PROFITS FOR WOMEN:

This book is a remarkable treasury of unique but common sense, easy to operate Little "big" money making businesses for many millions of today's serious and enterprising women interested in fabulous earnings, independence and security. Little or no investment and fast starting full- and part-time income increasing activities. (only \$6.95)

14. EASIEST AND FASTEST WAY TO START A SUCCESSFUL MAIL ORDER BUSINESS ON A SHOESTRING:

Simple, and most effective, step-by-step mail order start-up and operating instructions written especially for beginners. Crammed with vital facts ... Covers every aspect of this exciting big money field. (only \$6.95)

15. HOW TO SEE THE WORLD ... TRAVEL AND GET PAID WELL FOR IT:

Everyone enjoys traveling. But most people cannot afford to travel to those far away places they dreamed of visiting. Here's your chance to take in the wonderful sights throughout the world — and actually get paid for doing it. Yes, it's truly possible that this little known strictly legal method could provide you with the information for doing it. (only \$6.95)

Fifteen Ways For You To Have Bulging Bank Accounts, Beautiful Homes, Expensive Clothes, Jewelry, Exotic Vacations ... The Very Best Colleges For Your Kids ... Plus, Keep A Steady Income Flowing In!

Everyone of the 15 Manuals' home-based businesses, can be successfully operated, by a single person, retirees, unemployed people — most ideal for husband/wife teams — and can be, almost, instantly turned into an enterprising family operated business, kids can help too. With everyone pitching in ... your business could suddenly take off, and profits could increase fast!

More Businesses You Operate ... More Money You Make ... Guarantees You Riches Beyond Your Wildest Dreams!

So, be sure to keep in mind that: Even though, it's true — some good money could be made with just a single one of these start-up success manuals working for you ... but, much better than that, you could give yourself a greater opportunity to make your profits multiply much faster, by simply putting together a super powerful profitable combination of five, ten, or more of these fifteen — fastest, easiest ... proven profitable businesses out of over a thousand in our files. Imagine having them all operating, and bringing in big hefty profits for you, at the same time! But you must send your order in right away. Supplies are extremely limited at these special introductory low prices!

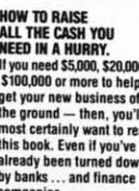
FREE The More Success Manuals You Order The More FREE Limited Editions You Get

Buy Any 2 to 5 SUCCESS MANUALS And Get Free! Any One Of The Three LIMITED EDITIONS Below, or Buy Any 6 to 10 SUCCESS MANUALS And Get Free! Any Two Of The Three Below, or Buy Any 11 to 15 SUCCESS MANUALS And Get Free! All Three Below.

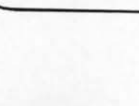
HOW TO RAISE ALL THE CASH YOU NEED IN A HURRY



HOW TO QUICKLY WIPE OUT ALL YOUR DEBTS AND TURN BAD CREDIT RATING INTO GOOD!



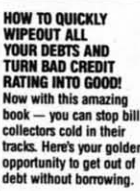
HOW TO RETIRE YOUNG AND LIVE LUXURIOUSLY ON VERY LITTLE MONEY



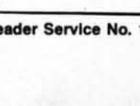
HOW TO RAISE ALL THE CASH YOU NEED IN A HURRY



HOW TO QUICKLY WIPE OUT ALL YOUR DEBTS AND TURN BAD CREDIT RATING INTO GOOD!



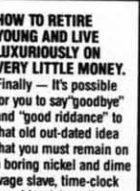
HOW TO RETIRE YOUNG AND LIVE LUXURIOUSLY ON VERY LITTLE MONEY



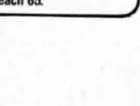
HOW TO RAISE ALL THE CASH YOU NEED IN A HURRY



HOW TO QUICKLY WIPE OUT ALL YOUR DEBTS AND TURN BAD CREDIT RATING INTO GOOD!



HOW TO RETIRE YOUNG AND LIVE LUXURIOUSLY ON VERY LITTLE MONEY



FINALLY — A REAL OPPORTUNITY TO ENJOY A RICHER ... BETTER LIFE

Our organization — Successful Business Publishers, offers what is perhaps the largest Collection of Unique "Home-business" Beginner's Success Manuals in the world! Out of over a thousand of businesses in our organization's files — our home business specialists, have painstakingly selected The 15 Fastest, Easiest ... Most highly Profitable part-time and fulltime Businesses you and other beginners can quickly start and easily operate from home — with very low or, virtually, no investment.

How many of these Proven, Highly Profitable Enterprises, can you combine together and successfully operate — and Benefit From At The Same Time? Possibly, all fifteen if you're that ambitious ... The big Shrewd Corporations, call this almost secret method "diversification" which is, merely, a high sounding big word, which simply boils down to — having a lot of different businesses, operating ... and pouring fast-fat profits into your pockets, at the same time.

Let's face it — Plain common sense says that — the more of these 15 Proven Profitable Businesses, you choose to operate at the same time ... the bigger, and faster your profits could be! Of course, our organization will profit a few more dollars if you choose to put five, ten or all fifteen of our proven profitable, start-up success manuals, to work for you.

But then — why should our making a modest few dollars of profit bother you — when it's you, who makes ... and keeps all the income — no matter how much — Your different home businesses bring in? The demand for our unique wealth-building, Beginners Start-Up Success Manuals has been so overwhelming ... and, understandably so too, since, there's absolutely nothing like them on the market!

Our No-Risk Success Guarantee To You

You must be absolutely, positively, and totally convinced that the actual money making success profitability of each manual is real — and may quickly increase your income or you may return everything within 10 days for a prompt no hassle refund.

Remember, those who snooze will certainly lose. However, those who choose right now, to begin — can win, and right now, while there's still time, is the best time to begin. You'll be making a very wise and highly profitable move. ORDER NOW!

Beginners Start-Up Success Manuals Order Form

Circle the manuals you are ordering
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15

I have circled above the catalog number of each Success Manual I am ordering, and I've included the proper amount to help cover shipping and handling, as indicated below. Also, I'm fully protected by your organization's strong, no-risk success guarantee that — unless I am totally convinced that the actual money making success profitability of my manual(s) is real — and may quickly increase my income. Also, I may return everything within 10 days, for a prompt, no-hassle, full refund.

Total Success Manuals Ordered _____

Full Amount Enclosed _____

Be sure to include proper shipping and handling fee — see charges below:

SHIPPING AND HANDLING CHARGES

Ordering just one Success Manual Add \$1.25 for S&H

Ordering from 2 to 5 Success Manuals Add 90¢ per each manual

Ordering from 6 to 14 Success Manuals Add 50¢ per each manual

ENJOY BIG SAVINGS ON ORDERS FOR ALL 15 SUCCESS MANUALS — We pay all Shipping & Handling Cost. (a hefty savings of \$7.50!)

Note: We pay shipping and handling on each Limited Edition Manual your order qualifies for.

Check the box below which indicates each desired FREE Limited Edition Manual(s) Title(s) which your order qualifies you to receive FREE:

☐ How to quickly wipe out all your debts and turn bad credit rating into good

☐ How to raise all the cash you need in a hurry

☐ How to retire young and live luxuriously on very little money

METHOD OF PAYMENT (all prices are in U.S. funds):

☐ My check or money order is enclosed (do not send currency through the mail).

Sorry — due to high percentage of sale charged by card companies — charge card orders not accepted.

SHIP TO

Name _____

Address _____

City _____

State _____ Zip _____

Complete this order form and mail to:

SUCCESS BUSINESS PUBLISHERS

110 W. 5th Street Dept. AM-2

Winston-Salem, N.C. 27101

© 1985 Successful Business Publishers

A more sophisticated program starts with large increments of X until the approximate range of the answer is found. Then the increment is reduced and a smaller range of X values is searched. This process is repeated until the desired accuracy is obtained.

The most elegant approach is to use one of the standard methods of numerical analysis for finding roots of equations. The program below from Andy Young (Ottawa, ONT) uses a method he calls fixed-point iteration.

```

1 REM =====
2 REM   COMMODARES PROBLEM #36-4 :
3 REM   CROSSED LADDERS
4 REM   SOLUTION BY
5 REM   ANDY YOUNG
6 REM =====
7 LL=30 : LS=20 : HT=6 : K=2
8 X0=1 : REM INITIAL VALUE
9 PRINT "X0, GX, HX"
10 FOR II=0 TO -1 STEP -1
11 HS=SQR(LS*LS-X0*X0)
12 HL=SQR(LL*LL-X0*X0)
13 HX=HS*HL/(HS+HL)
14 FX=HT-HX
15 GX=X0-FX/K
16 PRINT X0,GX,HX
17 X0=GX

```

```

180 II=(ABS(FX/GX) < 1E-8)
190 NEXT II

```

The goal is to find a value of X to satisfy the equation $HX=6$. This function of X is written as $F(X)=6-HX$ where now the goal is to solve for $F(X)=0$. (Yes, this is confusing at first. If $F(X)=0$, then $6-HX=0$, and therefore, $HX=6$ as desired.)

The procedure is to restate the function of X in the form $X=G(X)$. The simplest form for $G(X)$ is $G(X) = X - F(X)/K$ where K is any constant. The iteration involves evaluating $G(X)$, assigning this value to X, and then evaluating $G(X)$ again. The iteration is repeated until X stops changing. At this point, X and $G(X)$ are the same, and $F(X)$ is zero as desired.

Andy uses the FOR/NEXT loop at line 100 as a DO WHILE loop. On the C-128 you could replace lines 100 and 190 as follows:

```

100 DO WHILE II=0
190 LOOP

```

The values of HS, HL, and HX are calculated. Then FX and GX (representing $F(X)$ and $G(X)$) are evaluated. Line 170 assigns this new value of GX to X0. Line 180 determines the relative closeness of FX to 0. If FX is less than $1E-8$ times GX then II is set to -1, and the FOR-NEXT loop is completed. Otherwise II has the value 0, and the loop is repeated.

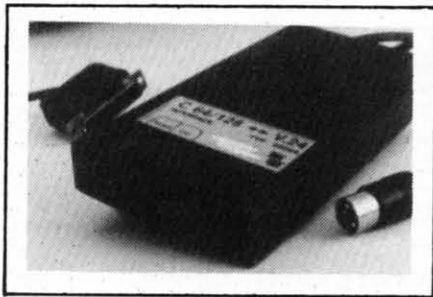
This general procedure can be used to find the zeroes of any function. Simply replace the definition of FX in line 140. For other equations you may have to pick a different value of K or a different initial value of X0 to get a proper answer. Changing K to -2 in this program for example causes convergence to a negative value of X0, a valid solution to the equation but not to the problem.

Andy said that there are other forms of $G(X)$ which converge ("home in") on the correct value of X faster than this fixed-point form, but this is the easiest form to determine and to program. The reader is referred to books on numerical analysis for further discussions. (Newton's method and secant method are two related topics. Newton's method uses the first derivative of $F(X)$ in place of K, for example.)

By the way, the answer to the problem is roughly 18.3 feet. Thanks to Troy Shoap and David Brouse (Shippensburg, PA) for their explanations and graphical analysis of the problem. They plotted "distance between buildings vs. height of intersection" for the two ladders. You might enjoy graphing this problem as well.

Congratulations also to Sarah Jane Butler (Decatur, IN), W.J. McMahon (Agawam, MA), Justin Smalley (Boulder, CO), Jim Frost (La Mesa, CA), Tom Zerrusen (Teutopolis, IL), Rick Schwamle (Overland, MO), Matt Shapiro (Fort Lee, NJ), and Jim Speers (Niles, MI) for work on this problem. Thanks for all the diagrams and detailed explanations. Keep those solutions and problems coming. □

Transfer Your Data From IBM-PC/RS232 to Commodore Computer C64/128 or Vice Versa



Brief Description:

- ✓ Baudrate 225 to 57600 selectable
- ✓ Hardware or XON/XOFF Handshake
- ✓ EEPROM - No Dip Switches
- ✓ Selectable Device Address
- ✓ 64 KByte Buffer Capacity

Price: Only \$149 (Part-Nº:98064)

(CA residents add tax 6.5%. Shipping/Handling (USA) add \$4 on all orders. Item subject to availability and price change without notice. Send check or money order)

We carry interfaces and cables for most major computers and printers.

TecTrans-Guertzen,
6925 Rosemead Blvd.,
San Gabriel, CA 91775
(818)285-3121


IBM-PC/XT/AT are trademarks of International Business Machines.
CBM/C64/128 are trademarks of Commodore Business Machines.

Reader Service No. 124

PROGRAM LISTINGS

Attention new Ahoy! readers! You must read the following information very carefully prior to typing in programs listed in Ahoy! Certain Commodore characters, commands, and strings of characters and commands will appear in a special format. Follow the instructions and listing guide on this page.

On the following pages you'll find several programs that you can enter on your Commodore computer. But before doing so, read this entire page carefully.

To insure clear reproductions, Ahoy!'s program listings are generated on a daisy wheel printer, incapable of printing the commands and graphic characters used in Commodore programs. These are therefore represented by various codes enclosed in brackets []. For example: the SHIFT CLR/HOME command is represented onscreen by a heart . The code we use in our listings is [CLEAR]. The chart below lists all such codes which you'll encounter in our listings, except for one other special case.

The other special case is the COMMODORE and SHIFT characters. On the front of most keys are two symbols. The symbol on the left is obtained by pressing that key while holding down the COMMODORE key; the symbol on the right, by pressing that key while holding down the SHIFT key. COMMODORE and SHIFT characters are represented in our listings by a lower-case "s" or "c" followed by the symbol of the key you must hit. COMMODORE J, for example, is represented by [c J],

and SHIFT J by [s J].
































Additionally, any character that occurs more than two times in a row will be displayed by a coded listing. For example, [3 "[LEFT]"] would be 3 CuRSOR left commands in a row, [5 "[s EP]"] would be 5 SHIFTEd English Pounds, and so on. Multiple blank spaces will be noted in similar fashion: e.g., 22 spaces as [22 " "].

Sometimes you'll find a program line that's too long for the computer to accept (C-64 lines are a maximum of 80 characters, or 2 screen lines long; VIC 20 lines, a maximum of 88 characters, or 4 screen lines). To enter these lines, refer to the *BASIC Command Abbreviations Appendix* in your User Manual.

On the next page you'll find our *Bug Repellent* programs for the C-128 and C-64. The version appropriate for your machine will help you proofread our programs after you type them. (Please note: the *Bug Repellent* line codes that follow each program line, in the whited-out area, should *not* be typed in. See the instructions preceding each program.)

Also on the following page you will find *Flankspeed*, our ML entry program, and instructions on its use. ☐

Call Ahoy! at 212-239-0855 with any problems.

When You See	It Means	You Type	You Will See	When You See	It Means	You Type	You Will See
[CLEAR]	Screen Clear	SHIFT CLR/HOME		[BLACK]	Black	CNTRL 1	
[HOME]	Home	CLR/HOME		[WHITE]	White	CNTRL 2	
[UP]	Cursor Up	SHIFT ↑ CRSR ↓		[RED]	Red	CNTRL 3	
[DOWN]	Cursor Down	↓ CRSR ↓		[CYAN]	Cyan	CNTRL 4	
[LEFT]	Cursor Left	SHIFT ← CRSR →		[PURPLE]	Purple	CNTRL 5	
[RIGHT]	Cursor Right	→ CRSR →		[GREEN]	Green	CNTRL 6	
[SS]	Shifted Space	SHIFT Space		[BLUE]	Blue	CNTRL 7	
[INSERT]	Insert	SHIFT INST/DEL		[YELLOW]	Yellow	CNTRL 8	
[DEL]	Delete	INST/DEL		[F1]	Function 1	F1	
[RVSON]	Reverse On	CNTRL 9		[F2]	Function 2	SHIFT F1	
[RVSOFF]	Reverse Off	CNTRL 0		[F3]	Function 3	F3	
[UPARROW]	Up Arrow	↑		[F4]	Function 4	SHIFT F3	
[BACKARROW]	Back Arrow	←		[F5]	Function 5	F5	
[PI]	PI	π		[F6]	Function 6	SHIFT F5	
[EP]	English Pound	£		[F7]	Function 7	F7	
				[F8]	Function 8	SHIFT F7	

BUG REPELLENT By MICHAEL KLEINERT and DAVID BARRON

Bug Repellent is a checksum program used for proofreading BASIC listings typed in from *Ahoy!* magazine. For each program line you enter, *Bug Repellent* will produce a two-letter code that should match the code listed beside that line in the magazine.

Type in, save, and run the *Bug Repellent*. (If you have a C-64, type in the C-64 version. If you have a C-128, you will need to type in the C-64 version for use with C-64 programs, and the C-128 version for use with C-128 programs.) If you have typed in *Bug Repellent* properly, you will get the message BUG REPELLENT INSTALLED; otherwise you will get an error message. If you get an error message, double check the *Bug Repellent* program for typing mistakes. Type NEW and hit RETURN. Then type in and save, or load, the *Ahoy!* program you wish to check. Type in SYS 49152 for the C-64 version or SYS 3072 for the C-128 version and hit RETURN (this will begin execution of *Bug Repellent*). You will see the prompt SCREEN OR PRINTER? Hit S if you want the codes listed on the screen, or P if you want them listed on the printer. To pause the listing depress and hold the SHIFT key.

Compare the codes your machine generates to those listed to the right of the corresponding program lines. If you spot a difference, that line contains an error. Write down the numbers of the lines where the contradictions occur. LIST each line, locate the errors, and correct them.

COMMODORE 64 VERSION

```

100 FOR X = 49152 TO 49488:READY:S=S+Y      AB
110 IF Y<0 OR Y>255 THEN 130                 EA
120 POKE X,Y:NEXT:GOTO140                     ID
130 PRINT"[CLEAR][DOWN]**ERROR**":PRINT"[DOWN
PLEASE CHECK LINE"PEEK(64)*256+PEEK(63):END ID
140 IF S<>44677 THEN PRINT"[CLEAR][DOWN]**ERR
OR**":PRINT"[DOWN]PLEASE CHECK DATA LINES 170
-500":END                                     HJ
150 PRINT"[CLEAR]":POKE53280,0:POKE53281,6:PO
KE646,1                                       NP
160 PRINT"[RVSON][6" "]"C-64 BUG REPELLENT INS
TALLED[6" "]"                                LF
170 DATA32,161,192,165,43,133,251,165,44,133 DL
180 DATA252,160,0,132,254,32,37,193,234,177 DB
190 DATA251,208,3,76,138,192,230,251,208,2 OF
200 DATA230,252,76,43,192,76,73,78,69,32 KN
210 DATA35,32,0,169,35,160,192,32,30,171 CA
220 DATA160,0,177,251,170,230,251,208,2,230 CE
230 DATA252,177,251,32,205,189,169,58,32,210 JE
240 DATA255,169,0,133,253,230,254,32,37,193 CL
250 DATA234,165,253,160,0,76,13,193,133,253 NB
260 DATA177,251,208,237,165,253,41,240,74,74 MB
270 DATA74,74,24,105,65,32,210,255,165,253 EP
280 DATA 41,15,24,105,65,32,210,255,169,13 GH
290 DATA32,220,192,230,63,208,2,230,64,230 AN
300 DATA251,208,2,230,252,76,11,192,169,153 NG
310 DATA160,192,32,30,171,166,63,165,64,76 BF
320 DATA231,192,96,76,73,78,69,83,58,32 EP
330 DATA0,169,247,160,192,32,30,171,169,3 PJ
340 DATA133,254,32,228,255,201,83,240,6,201 FK
350 DATA80,208,245,230,254,32,210,255,169,4 FL
360 DATA166,254,160,255,32,186,255,169,0,133 CL
370 DATA63,133,64,133,2,32,189,255,32,192 GC
380 DATA255,166,254,32,201,255,76,73,193,96 NN
390 DATA32,210,255,173,141,2,41,1,208,249 NH
400 DATA96,32,205,189,169,13,32,210,255,32 IM
410 DATA204,255,169,4,76,195,255,147,83,67 KC
420 DATA82,69,69,78,32,79,82,32,80,82 DC
430 DATA 73,78,84,69,82,32,63,32,0,76 ML
440 DATA44,193,234,177,251,201,32,240,6,138 GN
450 DATA113,251,69,254,170,138,76,88,192,0 JK
460 DATA0,0,0,230,251,208,2,230,252,96 NA
470 DATA170,177,251,201,34,208,6,165,2,73 DM
480 DATA255,133,2,165,2,208,218,177,251,201 JA
490 DATA32,208,212,198,254,76,29,193,0,169 FM
500 DATA13,76,210,255,0,0,0 PA

```

COMMODORE 128 VERSION

```

100 FAST:FOR X = 3072 TO 3520:READ Y:POKE X,Y
:S=S+Y:TRAP110:NEXT:SLOW                    IH
110 SLOW:IF S<>49057 THEN PRINT"[CLEAR][DOWN]
**ERROR**":PRINT"[DOWN]PLEASE CHECK DATA LINE
S 140-390":END                               JA

```

```

120 PRINT"[CLEAR][DOWN] C-128 BUG REPELLENT
INSTALLED"                                   II
130 PRINT"[4" "]"TYPE SYS 3072 TO ACTIVATE" IN
140 DATA 32,161,12,165,45,133,251,165,46,133,
252,160,0,132,254,32,37                     OF
150 DATA 13,234,177,251,208,3,76,138,12,230,2
51,208,2,230,252,76,43                       NC
160 DATA 12,76,73,78,69,32,35,32,0,169,35,160
12,32,80,13,160,0,177                       OL
170 DATA 251,170,230,251,208,2,230,252,177,25
1,32,89,13,169,58,32,98                     EF
180 DATA 13,169,0,133,253,230,254,32,37,13,23
4,165,253,160,0,76,13                       JO
190 DATA 13,133,253,177,251,208,237,165,253,4
1,240,74,74,74,74,24                       LC
200 DATA 105,65,32,98,13,165,253,41,15,24,105
65,32,98,13,169,13,32                     DE
210 DATA 220,12,230,65,208,2,230,66,230,251,2
08,2,230,252,76,11,12                     GM
220 DATA 169,153,160,12,32,80,13,166,65,165,6
6,76,231,12,96,76,73,78                   CP
230 DATA 69,83,58,32,0,169,247,160,12,32,80,1
3,169,3,133,254,32,107                     HC
240 DATA 13,201,83,240,6,201,80,208,245,230,2
54,32,98,13,169,4,166                     GK
250 DATA 254,160,255,32,116,13,169,0,133,65,1
33,66,133,250,32,125,13                   LB
260 DATA 32,134,13,166,254,32,143,13,76,73,13
96,32,98,13,165,211                       JF
270 DATA 234,41,1,208,249,96,32,89,13,169,13,
32,98,13,32,152,13,169,4                 GD
280 DATA 76,161,13,147,83,67,82,69,69,78,32,7
9,82,32,80,82,73,78,84,69                 PL
290 DATA 82,32,63,32,0,76,44,13,234,177,251,2
01,32,240,6,138,113,251,69               OK
300 DATA 254,170,138,76,88,12,0,0,0,0,230,251
208,2,230,252,96,170,177                 FJ
310 DATA 251,201,34,208,6,165,250,73,255,133,
250,165,250,208,218,177                   GA
320 DATA 251,201,32,208,212,198,254,76,29,13,
0,169,13,76,98,13,0,0,32                 FI
330 DATA 170,13,32,226,85,76,180,13,32,170,13
32,50,142,76,180,13,32                   OF
340 DATA 170,13,32,210,255,76,180,13,32,170,1
3,32,228,255,76,180,13,32                 AK
350 DATA 170,13,32,186,255,76,180,13,32,170,1
3,32,189,255                               BP
360 DATA 76,180,13,32,170,13,32,192,255,76,18
0,13,32,170,13                             FP
370 DATA 32,201,255,76,180,13,32,170,13,32,20
4,255,76,180,13,32,170                   ID
380 DATA 13,32,195,255,76,180,13,133,67,169,0
141,0,255,165,67,96                       BJ
390 DATA 133,67,169,0,141,1,255,165,67,96,0,0
0,0                                         IF

```


FLANKSPEED FOR THE C-64 By GORDON F. WHEAT

Flankspeed will allow you to enter machine language *Ahoy!* programs without any mistakes. Once you have typed the program in, save it for future use. While entering an ML program with *Flankspeed* there is no need to enter spaces or hit the carriage return. This is all done automatically. If you make an error in a line a bell will ring and you will be asked to enter it again. To LOAD in a program Saved with *Flankspeed* use LOAD "name",1,1 for tape, or LOAD "name",8,1 for disk. The function keys may be used after the starting and ending addresses have been entered.

f1 - SAVES what you have entered so far.

f3 - LOADs in a program worked on previously.

f5 - To continue on a line you stopped on after LOADING in the previous saved work.

f7 - Scans through the program to locate a particular line, or to find out where you stopped the last time you entered the program.

f7 temporarily freezes the output as well.

100 POKE53280,12:POKE53281,11	LL 5	HD
105 PRINT"[CLEAR][c 8][RVSON][15" "]FLANKSPEED[15" "];	ED 390 PRINT:PRINT"ADDRESS NOT WITHIN SPECIFIED RANGE!":B=0:	OK
110 PRINT"[RVSON][5" "]MISTAKEPROOF ML ENTRY PROGRAM[6" "	GOTO415	FN
115 PRINT"[RVSON][9" "]CREATED BY G. F. WHEAT[9" "];	MC 395 PRINT:PRINT"NOT ZERO PAGE OR ROM!":B=0:GOTO415	PP
120 PRINT"[RVSON][3" "]COPR. 1984, ION INTERNATIONAL INC.	DM 400 PRINT"?ERROR IN SAVE":GOTO415	PO
[3" "];	405 PRINT"?ERROR IN LOAD":GOTO415	PG
125 FORA=54272TO54296:POKEA,0:NEXT	DH 410 PRINT:PRINT:PRINT"END OF ML AREA":PRINT	BH
130 POKE54272,4:POKE54273,48:POKE54277,0:POKE54278,249:PO	IM 415 POKE54276,17:POKE54276,16:RETURN	IM
KE54296,15	420 OPEN15,8,15:INPUT#15,A,A\$:CLOSE15:PRINTA\$:RETURN	PC
135 FORA=680TO699:READB:POKEA,B:NEXT	NH 425 REM GET FOUR DIGIT HEX	GM
140 DATA169,251,166,253,164,254,32,216,255,96	KO 430 PRINT:PRINTB\$:INPUT\$	NP
145 DATA169,0,166,251,164,252,32,213,255,96	HJ 435 IFLEN(T\$)<>4THENGOSUB380:GOTO430	FJ
150 B\$="STARTING ADDRESS IN HEX":GOSUB430:AD=B:SR=B	JB 440 FORA=1TO4:A\$=MID\$(T\$,A,1):GOSUB450:IFT(A)=16THENGOSUB	GF
155 GOSUB480:IFB=0THEN150	KA 380:GOTO430	EH
160 POKE251,T(4)+T(3)*16:POKE252,T(2)+T(1)*16	GN 445 NEXT:B=(T(1)*4096)+(T(2)*256)+(T(3)*16)+T(4):RETURN	KP
165 B\$="ENDING ADDRESS IN HEX":GOSUB430:EN=B	KE 450 IFA\$>"@ANDAS\$<"G"THENT(A)=ASC(A\$)-55:RETURN	NP
170 GOSUB470:IFB=0THEN150	LO 455 IFA\$>"/ANDAS\$<:""THENT(A)=ASC(A\$)-48:RETURN	LI
175 POKE254,T(2)+T(1)*16:B=T(4)+1+T(3)*16	EE 460 T(A)=16:RETURN	LB
180 IFB>255THENB=B-255:POKE254,PEEK(254)+1	MN 465 REM ADDRESS CHECK	KC
185 POKE253,B:PRINT	GE 470 IFAD>ENTHEN385	MG
190 REM GET HEX LINE	HN 475 IFB<SRORB:ENTHEN390	IM
195 GOSUB495:PRINT": [c P][LEFT]";:FORA=0TO8	IL 480 IFB<256OR(B>4096)ANDB<49152)ORB>53247THEN395	FD
200 FORB=0TO1:GOTO250	NH 485 RETURN	PE
205 NEXTB	MP 490 REM ADDRESS TO HEX	JP
210 A\$(A)=T(1)+T(0)*16:IFAD+A-1=ENTHEN340	ME 495 AC=AD:A=4096:GOSUB520	AC
215 PRINT" [c P][LEFT]";	LE 500 A=256:GOSUB520	LH
220 NEXTA:T=AD-(INT(AD/256)*256):PRINT" "	IK 505 A=16:GOSUB520	LM
225 FORA=0TO7:T=T+A\$(A):IFT>255THENT=T-255	PD 510 A=1:GOSUB520	LC
230 NEXT	LK 515 RETURN	AN
235 IFA\$(8)<>TTHENGOSUB375:GOTO195	IA 520 T=INT(AC/A):IFT>9THENA\$=CHR\$(T+55):GOTO530	CL
240 FORA=0TO7:POKEAD+A,A\$(A):NEXT:AD=AD+8:GOTO195	LE 525 A\$=CHR\$(T+48)	FG
245 REM GET HEX INPUT	BI 530 PRINTA\$:AC=AC-A*T:RETURN	OM
250 GETA\$:IFA\$=""THEN250	AB 535 A\$="**SAVE**":GOSUB585	DD
255 IFA\$=CHR\$(20)THEN305	HK 540 OPEN1,T,1,A\$:SYS680:CLOSE1	DF
260 IFA\$=CHR\$(133)THEN535	HF 545 IFST=0THENEND	IG
265 IFA\$=CHR\$(134)THEN560	KH 550 GOSUB400:IFT=8THENGOSUB420	BO
270 IFA\$=CHR\$(135)THENPRINT" ":GOTO620	JM 555 GOTO535	IM
275 IFA\$=CHR\$(136)THENPRINT" ":GOTO635	EG 560 A\$="**LOAD**":GOSUB585	OH
280 IFA\$>"@ANDAS\$<"G"THENT(B)=ASC(A\$)-55:GOTO295	AB 565 OPEN1,T,0,A\$:SYS690:CLOSE1	GH
285 IFA\$>"/ANDAS\$<:""THENT(B)=ASC(A\$)-48:GOTO295	DL 570 IFST=64THEN195	PH
290 GOSUB415:GOTO250	MD 575 GOSUB405:IFT=8THENGOSUB420	FA
295 PRINTA\$"[c P][LEFT]";	JJ 580 GOTO560	IB
300 GOTO205	OA 585 PRINT" ":PRINTTAB(14)A\$	PP
305 IFA\$>0THEN320	CF 590 PRINT:A\$=""INPUT"FILENAME":A\$	NK
310 A=-1:IFB=1THEN330	PG 595 IFA\$=""THEN590	EC
315 GOTO220	OI 600 PRINT:PRINT"TAPE OR DISK?":PRINT	GN
320 IFB=0THENPRINTCHR\$(20);CHR\$(20);:A=A-1	BM 605 GETB\$:T=1:IFB\$="D"THENT=8:A\$="@"+"A\$:RETURN	LI
325 A=A-1	HG 610 IFB\$<>"T"THEN605	IB
330 PRINTCHR\$(20);:GOTO220	BE 615 RETURN	
335 REM LAST LINE	LK 620 B\$="CONTINUE FROM ADDRESS":GOSUB430:AD=B	
340 PRINT" ":T=AD-(INT(AD/256)*256)	AD 625 GOSUB475:IFB=0THEN620	
345 FORB=0TOA-1:T=T+A\$(B):IFT>255THENT=T-255	GJ 630 PRINT:GOTO195	
350 NEXT	PL 635 B\$="BEGIN SCAN AT ADDRESS":GOSUB430:AD=B	
355 IFA\$(A)<>TTHENGOSUB375:GOTO195	IA 640 GOSUB475:IFB=0THEN635	
360 FORB=0TOA-1:POKEAD+B,A\$(B):NEXT	NF 645 PRINT:GOTO670	
365 PRINT:PRINT"YOU ARE FINISHED!":GOTO535	HN 650 FORB=0TO7:AC=PEEK(AD+B):GOSUB505:IFAD+B=ENTHENAD=SR:G	
370 REM BELL AND ERROR MESSAGES	JA OSUB410:GOTO195	
375 PRINT:PRINT"LINE ENTERED INCORRECTLY":PRINT:GOTO415	FL 655 PRINT" ":NEXTB	
380 PRINT:PRINT"INPUT A 4 DIGIT HEX VALUE!":GOTO415	DA 660 PRINT:AD=AD+8	
385 PRINT:PRINT"ENDING IS LESS THAN STARTING!":B=0:GOTO41	FF 665 GETB\$:IFB\$=CHR\$(136)THEN195	
	670 GOSUB495:PRINT" ":GOTO650	

INFOFLOW

FROM PAGE 37

```

100 TRAP1690
200 REM *****
300 REM * INFOFLOW *
400 REM * BY CLEVE BLAKEMORE *
500 REM * DATABASE FOR THE C128 *
600 REM *****
700 FAST:COLOR4,13:FORX=3584TO4096:READA:
POKEA,A:NEXT
800 COLOR0,1:COLOR4,12:COLOR5,7:COLOR1,15
:PRINTCHR$(14)CHR$(11):GRAPHIC 2,1,25
900 RESTORE2630:FORI=.TO63:READA:A$=A$+CH
R$(A):NEXTI:I=FRE(.):SPRSV1,B$:SPRSVA$
,1:SPRSV1,A$:SPRSVB$,1
1000 SPRITE1,1,16,,,,,:MOVSPR1,160,150:GS
HAPEA$,270,100
1100 RESTORE2720:FORX=2TO8:SPRITE1,1,7,,,
,:NEXT:FORX=2TO8:READA,I:MOVSPR1,A,I:BO
X1,A-29,I-55,A+5,I-25:NEXT:DRAW1,0,78TO3
20,78
1200 CHAR1,0,0,CHR$(14)+" *[12" "][s I]N
FO[s F]LOW[14" "]* ",1
1300 CHAR1,2,6,CHR$(14)+"[s S]AVE[6" "][s
N]EW[6" "][s D]ELETE[4" "][s V]IEW-[s A
]DD"
1400 CHAR1,2,7,CHR$(14)+"[s L]OAD[6" "][s
F]ILE[5" "][s R]ECORD[5" "][s R]ECORD"
1500 CHAR1,2,16,CHR$(14)+"[s S]ORT[4" "][
s S]EARCH[5" "][s H]ARDCOPY[3" "][s C]UR
RENT":CHAR1,32,17,CHR$(14)+"[s R]ECORD#"
1600 COLOR1,12:CHAR1,0,20,CHR$(14)+" * [
s B]Y [s C]LEVELAND [s M]. [s B]LAKEMORE
[11" "]",1
1700 CHAR1,0,22,CHR$(14)+"[3" "][s S][s P
][s A][s C][s E][SS][s I][s N][SS][s M][
s E][s M][s O][s R][s Y][SS][s F][s O][s
R][7" "][s R]ECORDS ! ":COLOR1,7:CHAR1
,16,24," QUIT ",1:SLOW
1800 TRAP1690:COLLISION1,1650:V=53248:M$=
"[3" "[DOWN]" ][c 5] [s N]O [s F]ILE IN [s
M]EMORY!":MC$="[3" "[DOWN]" ][c 5] [s F]ILE
[s C]URRENTLY IN [s M]EMORY!":CHAR1,23,
22,"[5" "]:DIMBO(7)
1900 FORX=0TO7:BO(X)=2[UPARROW]X:NEXT:TL=
.:EF=.:CR=.:X=.:Y=.:A=.:B=.:G=.:C=.:O=.:
I=.:J=.:N=.:RL%=.:FT$="":CR$=CHR$(13):A$
="":B$="":M=.:K=.:L=.:F=.
2000 SOUND1,15000,20,0,5000,5000,1:IFJOY(
2)THEN2000
2100 G=BUMP(1):DO:DO:A=JOY(2):IFA=.THENLO
OP:ELSEB=AAND15:I=(B-1)*45:MOVSPR1,-6*(B
<>0);I:A=JOY(2):LOOPWHILEA=B:IF(AAND128)
THENEXIT:ELSELOOP
2200 SOUND1,15000,20,0,5000,5000,1:X=RSPP
OS(1,0):Y=RSPPOS(1,1):IFX>270ANDX<320AND

```

KJ
KF
EI
HG
AO
KF
HP
PH
JA
PE
PE
BB
EO
DO
LL
GK
MD
PL
HK
OB
BF

```

Y>130ANDY<200THENGOSUB1370:C=.:O=.:G=BUM
P(1):GOTO2000
230 IFY>234THENBEGIN:SOUND1,25000,50,0,2
000,2000,0:COLOR1,15:CHAR1,16,24," QUIT
? ",1:DO:LOOPUNTILJOY(2)=.
240 DO:IFJOY(2)>127THENGGRAPHIC0:POKEV+21
,,:COLOR0,12:COLOR5,14:COLOR4,14:PRINTCH
R$(12)CHR$(14)CHR$(19)CHR$(19)CHR$(147)
:END
250 LOOPUNTILJOY(2)ANDJOY(2)<128:COLOR1,
7:CHAR1,16,24," QUIT ",1:O=.:G=.:C=.:G
OTO210
260 BEND
270 ONCGOSUB290,570,680,910,1040,1180,12
30
280 GOTO2000
290 REM SAVE/LOAD FILE
300 GOSUB1520:GRAPHIC0:PRINT"[CLEAR][BLU
E]":WINDOW1,2,39,24,1:DIRECTORY"[s I][s
F]*":WINDOW1,1,39,1,1:PRINT"[RVSON][c 8]
[s S][RVSOFF]AVE OR [RVSON][s L][RVSOFF]
OAD?[BLUE]";
310 POKE208,,:DO:GETKEYA$:LOOPUNTIL A$="S
"ORA$="L"
320 IFA$="L"THEN420
330 REM SAVE CURRENT FILE TO DISK
340 IF EF=.THENPRINT"[s N]O [s F]ILE IN
[s M]EMORY!":SLEEP5:GOSUB1500:RETURN
350 WINDOW0,1,39,1,1:PRINT"[HOME][c 8] [
s S][s A][s V][s I][s N][s G] [s F][s I]
[s L][s E] [BLUE]";FT$:CHR$(155);A$=FT$
360 SCRATCH"[s I][s F][s I]+A$:DOPEN#1,"[s
I][s F][s I]+A$+"W":IFDS>20THENPRINT"[RIGH
T]"DS$;SLEEP5:GOSUB1500:DCLOSE#1:RETURN
370 J=EF-1:PRINT#1,RL%;CR$:TL;CR$:J;CR$:
N;CR$:FT$:FORX=1TON:PRINT#1,N$(X);CR$:L%
(X):NEXT
380 FORJ=1TOEF-1:FORI=1TON:PRINT#1,R$(J,
I):NEXTI,J
390 DCLOSE#1
400 GOTO550
410 REM LOAD NEW FILE
420 IF EF THENPRINT"[s F]ILE IN [s M]EMOR
Y!":SLEEP5:GOSUB1500:RETURN
430 WINDOW0,1,39,1,1:PRINT"[c 8] [s F]IL
ENAME [BLUE]";A=10:GOSUB1560:A$=IN$:PRI
NTCHR$(155)
440 DOPEN#1,"[s I][s F][s I]+A$+"R"
450 IFDS>20THENPRINT"[RIGHT]"DS$;SLEEP5
:GOSUB1500:DCLOSE#1:RETURN
460 INPUT#1,RL%,TL,EF,N,FT$
470 DIMR$(TL,N),N$(N),L$(N)
480 FORI=1TON:INPUT#1,N$(I):INPUT#1,L$(I
)
490 NEXT
500 FORJ=1TOEF
510 FORI=1TON
520 GET#1,A$:IFA$<>CR$THENR$(J,I)=R$(J,I

```

AD
CI
JB
DO
BG
BB
BO
EB
PF
LK
JM
LD
PE
MH
HM
OP
PB
GD
CK
OC
CH
OI
FD
GG
IN
AC
CP
IA
NC
KJ

	) + A\$: GOTO 520	EI	TX	GA
AD	530 NEXT I, J: EF = EF + 1: CR = 1	OE	770 IF EF > 1 AND EF <> CR THEN EF = EF - 1	HB
2	540 DCLOSE #1	GD	780 PRINT "[DOWN][DOWN][s @][s R][s E][s	
CI	550 WINDOW 1, 39, 1, 1: PRINT "[RIGHT]" DS\$;	BN	C][s O][s R][s D][SS]#"; CR; "DELETED." : S	
1	560 SLEEP 5: GOSUB 1500: RETURN	JH	LEEP 3: IFA\$ = "[s D]" THEN RETURN: ELSE GOTO 900	DL
H	570 REM INITIALIZE NEW FILE	EP	790 BEND	BG
	580 GOSUB 1520: IF EF THEN PRINT "[DOWN][DOWN]		800 IFA\$ = "S" THEN BEGIN	AH
JB	" ; MC\$: SLEEP 5: GOSUB 1500: RETURN	BF	810 PRINT CHR\$(19) CHR\$(19) CHR\$(147); : PRIN	
G	590 RL% = .: TL = .: PRINT "[c 8][s F] ILENAME	CJ	T "[RVSON][BLUE][DOWN][s S][s H][s I][s F	
DO	[BLUE]"; A = 10: GOSUB 1560: FT\$ = IN\$		][s T] - [s E] TO [s E]XIT, [s S][s H][s I]	
BG	600 PRINT "[s N]UMBER OF FIELDS "; A = 2: GO		[s F][s T] - [s D] TO [s D][s E][s L][s E]	
2	SUB 1560: N = VAL(IN\$): IF N < 1 OR N > 2 THEN PRINT C		[s T][s E] RECORD"	CO
BB	HR\$(145) CHR\$(27) "J" CHR\$(27) "Q"; : GOTO 600:	BC	820 WINDOW 1, 2, 39, 24, 1	DH
BO	ELSE DIM N\$(N), L%(N)		830 DO: PRINT CHR\$(147); : GOSUB 1540	DL
EB	610 FOR X = 1 TO N: PRINT "[s N]AME [s F]IELD #	JN	840 GET A\$: IF JOY(2) = . AND A\$ = "" THEN 840	GO
	" ; X; " "; A = 39: GOSUB 1560: N\$(X) = IN\$		850 IF JOY(2) = 3 THEN CR = CR + 1: IF CR > EF THEN CR =	DC
U	620 A\$ = "": PRINT "[s L]ENGTH [s F]IELD #";		EF	AC
	X; " "; A = 3: GOSUB 1560: A\$ = IN\$: IF VAL(A\$) > . A		860 IF JOY(2) = 7 THEN CR = CR - 1: IF CR < 1 THEN CR = 1	KB
	ND VAL(A\$) < 256 THEN L%(X) = ABS(VAL(A\$)): ELSE	CH	870 IFA\$ = "[s D]" THEN GOSUB 750	CB
PF	PRINT "[s D]EFAULT (160) !": L%(X) = 160	OF	880 LOOP UNTIL A\$ = "[s E]"	BG
	630 RL% = RL% + L%(X): NEXT	DH	890 BEND	DK
LK	640 RL% = RL% + 3 * (N + 1) + 5: TL = INT(FRE(1) / RL%)		900 GOSUB 1500: RETURN	CL
JM	: EF = 2: DIM R\$(TL, N)		910 REM VIEW RECORD(S)	
LD	650 PRINT "[s T]HIS FILE WILL PERMIT AT L		920 GOSUB 1520: IF EF = . THEN PRINT M\$: SLEEP 5: G	EH
	EAST": PRINT "[RVSON]"; INT(FRE(1) / RL%); "[R		OSUB 1500: RETURN	JA
PE	VSOFF][s R]ECORDS.": PRINT "[DOWN][DOWN][R	AJ	930 GOSUB 940: GOSUB 1500: RETURN	NI
MH	VSON][s A][RVSOFF]CCEPT OR [RVSON][s R][	DF	940 GOSUB 1540: SLEEP 1	AB
	RVSOFF]EJECT?"		950 IF JOY(2) = . THEN 950	HA
HM	660 GET KEY A\$: IFA\$ <> "A" AND A\$ <> "R" THEN 660	KE	960 IF JOY(2) > 127 THEN RETURN	DC
	670 IFA\$ = "R" THEN COLLISION 1: EF = .: GOSUB 150	KK	970 IF JOY(2) = 3 THEN CR = CR + 1: IF CR > EF THEN CR =	AC
OP	0: RUN 180: ELSE PRINT "[DOWN][s E]MPTY [s F]		EF	BB
PB	ILE [s C]REATED.": CR = 1: SLEEP 5: GOSUB 1500:	IE	980 IF JOY(2) = 7 THEN CR = CR - 1: IF CR < 1 THEN CR = 1	CK
GD	RETURN	IG	990 IF JOY(2) = 1 THEN BEGIN: SOUND 1, 18000, 10,	BG
CK	680 REM DELETE RECORD(S)	NH	1, 2000, 5000, 2: PRINT CHR\$(19) CHR\$(17); : FOR	NE
OC	690 GOSUB 1520: IF EF = . THEN PRINT M\$: SLEEP 5: G		X = 1 TO N: PRINT "[c 8]"; N\$(X); "[BLUE][RIGHT]	AO
CH	OSUB 1500: RETURN: ELSE PRINT "[c 8][RVSON][s		";	OJ
OI	C][RVSOFF]URRENT [s R]ECORD, [RVSON][s S		1000 A = L%(X + 1): IN\$ = "": GOSUB 1570: IF IN\$ <>	BB
FD	][RVSOFF]CAN [s F]ILE, OR [RVSON][s A][RV		" THEN R\$(CR, X) = MID\$(IN\$, 2)	
GG	SOFF]LL?"		1010 NEXT: IF CR = EF AND R\$(CR, 1) <> "" THEN EF = C	
IN	700 GET KEY A\$: IFA\$ <> "C" AND A\$ <> "S" AND A\$ <> "		R + 1: IF EF > TL THEN EF = TL	CK
AC	A" THEN 700		1020 BEND	BG
CP	710 SOUND 1, 25000, 25, 0, 2000, 3000, 1		1030 PRINT CHR\$(147); : GOTO 940	NE
IA	720 IFA\$ = "A" THEN BEGIN: PRINT "[DOWN][DOWN]		1040 REM SORT RECORDS	AO
NC	[s D][s E][s L][s E][s T][s E][SS][s A][		1050 REM ("[s S]HELL [s M]ETZNER [s A]LG	OJ
KJ	s L][s L][SS][s R][s E][s C][s O][s R][s		ORITHM")	
	D][s S]![s A][s R][s E][SS][s Y][s O][s		1060 GOSUB 1520: IF EF = . THEN PRINT M\$: SLEEP 5:	EH
	U][SS][s S][s U][s R][s E]?([s Y] / [s N]		GOSUB 1500: RETURN	
	)": DO: GET KEY A\$: LOOP UNTIL A\$ = "Y" OR A\$ = "N": I		1070 DO: PRINT "[c 8][CLEAR][s S]ORT USING	
	FA\$ = "Y" THEN EF = .		[s F]IELD?(1 > "<"; N; " "): INPUT A\$: IFA\$ = ""	
	: COLLISION 1: GOSUB 1490: RUN 180: ELSE 900	MJ	THEN X = 1: EXIT: ELSE X = VAL(A\$): LOOP UNTIL X > . A	
	730 BEND	BG	NDX <= N: M = EF - 1: PRINT: PRINT "[DOWN][DOWN][s	JN
	740 IFA\$ = "C" THEN BEGIN	PH	S]TAND BY - [s S]ORTING [s F]ILE!"	JM
	750 PRINT "[DOWN][DOWN][s D][s E][s L][s		1080 SLEEP 3: FAST	JP
	E][s T][s I][s N][s G][4".": SOUND 1, 250	GK	1090 M = INT(M / 2): IF M = . THEN 1170	EA
	00, 15, 0, 3000, 8000, 1		1100 K = (EF - 1) - M: J = 1	EA
	760 FOR I = 1 TO N: R\$(CR, I) = "": NEXT: FOR X = 1 TO E		1110 I = J	
	F - 1: IFR\$(X, 1) = "" THEN FOR I = 1 TO N: R\$(X, I) = R\$		1120 COLOR 4, (J AND 15) + 1: L = I + M: IFR\$(I, X) <=	AG
	(X + 1, I): R\$(X + 1, I) = "": NEXT I: NEXT X: ELSE NEX		R\$(L, X) THEN 1150	

•1130 FORR=1TON:A\$=R\$(I,R):R\$(I,R)=R\$(L,R):R\$(L,R)=A\$:NEXT	CK	•1480 COLOR1,16:CHAR1,32,18,"[6" "]:IFEF THENA\$=STR\$(CR):CHAR1,32,18,A\$:RETURN:EL	HP
•1140 I=I-M:IFI>=1THEN1120	HM	SERETURN	GG
•1150 J=J+1:IFJ>KTHEN1090	NE	•1490 REM SWITCH BACK TO COMMAND SCREEN	GG
•1160 GOTO1110	FC	•1500 GRAPHIC2,0,25:MOVSPR1,160,150:POKEV	
•1170 COLOR4,12:SLOW:PRINT"[DOWN][DOWN][s @] [s S][s O][s R][s T][SS][s C][s O][s M][s P][s L][s E][s T][s E][s D]":SLEEP5:GOSUB1500:RETURN	PC	+21,255:CHAR1,23,22,"[6" "]:GOSUB1480:IFEF THENA\$=STR\$(INT(FRE(1)/RL%)):CHAR1,22,22,A\$:RETURN:ELSE RETURN	PB
•1180 REM SEARCH RECORDS,FIND STRING	CN	•1510 REM SWITCH TO TEXT	GB
•1190 GOSUB1520:IFEF=.THENPRINTM\$:SLEEP5:GOSUB1500:RETURN	EH	•1520 PRINTCHR\$(19)CHR\$(19)CHR\$(147):WINDOW 1,1,39,24,1:GRAPHIC2,0,1:POKEV+21,0:RETUR	ED
•1200 WINDOW1,1,39,1,1:PRINT"[c 8][s S]EARCH [s S]TRING:[BLUE]";:A=23:GOSUB1560:A\$=IN\$	AC	•1530 REM CHROUT ONE RECORD	AE
•1210 PRINT"[c 8][s S]EARCHING[3" "];:WINDOW1,2,39,24,1:FORJ=1TOEF-1:FORI=1TON:I	AC	•1540 PRINT"[c 8][RVSON] [s R][s E][s C][s O][s R][s D][SS]#";CR;"IN [s F][s I][s L][s E][SS]";FT\$:FORX=1TON:PRINT"[c 8]"	
FINSTR(R\$(J,I),A\$)THENCN=J:GOSUB940:CR=J	LK	;N\$(X);": "[BLUE]";R\$(CR,X):NEXT:RETUR	CP
•1220 NEXTI,J:PRINT"[HOME][HOME][CLEAR][c 8][DOWN][RIGHT][s S]EARCH COMPLETED.";:SLEEP3:GOSUB1500:RETURN	OG	N	KE
•1230 REM HARDCOPY	OD	•1550 REM TAMPERPROOF INPUT	OA
•1240 GOSUB1520:IFEF=.THENPRINTM\$:SLEEP5:GOSUB1500:RETURN:ELSEPRINT"[RVSON][BLUE][3"*"] [4" "][s L]INE [s R]ANGE FOR [s H]ARDCOPY[4" "][3"*"] "	DA	•1560 PRINTCHR\$(27);"Q";:IN\$=""	DH
•1250 WINDOW1,3,39,3,1:A\$="":INPUT"[c 8][s F]ROM:";A\$:IFA\$=""THENF=1:ELSEF=VAL(A\$)	OD	•1570 POKE208,..:POKE244,1	
•1260 IFF<10RF>EFTHEN1250	HG	•1580 GETZ\$:Z=ASC(Z\$):IFZ=.OR(Z>95ANDZ<193)ORZ>218THENPOKE244,..:PRINT"[RVSON] [LEFT][RVSOFF]";:POKE244,1:GOTO1580	CJ
•1270 WINDOW1,4,39,4,1:A\$="":INPUT"[s T]O:";A\$:IFA\$=""THENL=EF-1:ELSEL=VAL(A\$)	HH	•1590 ZL=LEN(IN\$):IFZL=ATHEN1610	PN
•1280 IFL<10RL>EFTHEN1270:ELSEIFL<FTHEN1250	PE	•1600 IFZ>31THENIN\$=IN\$+Z\$:PRINTZ\$:CHR\$(27)"Q";:GOTO1580	JM
•1290 PRINT"[HOME][HOME]":PRINT"[c 8][3"[DOWN]] [s @] [s P][s R][s I][s N][s T][s I][s N][s G] [s F][s I][s L][s E] ";FT\$:GRAPHIC0	ED	•1610 IFZ=13ANDZLTHENPOKE204,1:PRINT" ":RETUR	JH
•1300 OPEN4,4,7:CMD4	JP	•1620 IFZ=20ANDZLTHENIN\$=LEFT\$(IN\$,ZL-1):POKE244,..:PRINT" [LEFT][LEFT] [LEFT]";:POKE244,1	CH
•1310 :	DI	•1630 GOTO1580	FP
•1320 FORJ=FTOL:CR=J:GOSUB1540:PRINT:NEXT	MC	•1640 REM INTERRUPT PROCESSING	KE
•1330 PRINT#4,""	EK	•1650 G=BUMP(1)AND254:IFG=0THENRETURN	OL
•1340 CLOSE4,4	DN	•1660 FORX=1TO7:IFBO(X)=GTHENC=X:O=G:G=BU	DI
•1350 PRINT"[c 8][3"[DOWN]] [s @] [s D][s O][s N][s E]":SLEEP3	IE	MP(1):NEXT:ELSENEXT	IM
•1360 GOSUB1500:RETURN	DK	•1670 RETURN	JC
•1370 REM GET RECORD NUMBER IN I	NO	•1680 REM ERROR TRAPPING	DB
•1380 IFEF=.THENRETURN	DO	•1690 COLLISION1,1650:IFER=30THENRESUME	
•1390 IFJOY(2)THEN1390	FH	•1700 IFER=5ANDEL=1290THENPRINT"[3"[DOWN]] [s A][s B][s O][s R][s T][s I][s N][s G] [s H][s A][s R][s D][s C][s O][s P][s Y].[s P][s R][s I][s N][s T][s E][s R] [s O][s F][s F][SS][s L][s I][s N][s E] !":SLEEP3:GOSUB1500:RETURN	GG
•1400 GOSUB1480	GC	•1710 IFER=5THENPRINT"[3"[DOWN]] [s D][s E][s V][s I][s C][s E] [s N][s O][s T] [s P][s R][s E][s S][s E][s N][s T]!";:SLEEP3:GOSUB1500:RETURN	AJ
•1410 IFJOY(2)=3THENCN=CR+1	BN	•1720 IFER<9THENPRINTCHR\$(19)CHR\$(19);DS\$;:RESUME	OK
•1420 IFJOY(2)=5THENCN=CR-10	FK	•1730 IFER=24THENPRINT"[3"[DOWN]] [s F][s I][s L][s E][SS][s D][s A][s T][s A][s S][s E][s R][s R][s O][s R]";:SLEEP5:GOSUB1500:RETURN	EL
•1430 IFJOY(2)=7THENCN=CR-1	EI	•1740 PRINTERR\$(ER);" ERROR IN ";EL:SLOW:GOSUB1500:END	EK
•1440 IFJOY(2)=1THENCN=CR+10	HB		
•1450 IFCR<1THENCN=1:ELSEIFCR>EFTHENCN=EF	FE		
•1460 IFJOY(2)>127THENMOVSPR1,160,150:RETUR	GL		
•1470 GOTO1400	FO		

F 1750 REM SPRITE DATA
 L 1760 DATA0,0,0,0,0,0
 HP 1770 DATA0,0,0,3,255,128
 GG 1780 DATA2,1,0,2,2,0
 V 1790 DATA2,4,0,2,2,0
 I 1800 DATA2,1,0,2,0,128
 2 1810 DATA2,96,64,2,144,32
 PB 1820 DATA3,8,16,0,4,8
 GB 1830 DATA0,2,4,0,1,2
 D 1840 DATA0,0,129,0,0,65
 R 1850 DATA0,0,34,0,0,20
 ED 1860 DATA0,0,8,0,0,0
 AE 1870 DATA0,7,255,240,7,227
 1880 DATA240,7,221,224,7,221
 1890 DATA240,7,221,240,7,227
 1900 DATA240,7,255,240,7,247
 1910 DATA240,7,247,240,7,247
 CP 1920 DATA240,7,255,240,0,0
 KE 1930 DATA0,255,255,255,198,0
 OA 1940 DATA3,197,255,227,197,64
 DH 1950 DATA35,197,255,227,192,0
 1960 DATA3,255,255,255,0,0
 1970 DATA0,0,128,0,0,64
 CJ 1980 DATA0,0,36,15,255,20
 PN 1990 DATA16,3,12,32,5,124
 2000 DATA64,9,0,255,241,0
 JM 2010 DATA128,17,0,143,17,0
 R 2020 DATA128,17,0,255,241,0
 JH 2030 DATA128,17,0,143,17,0
 2040 DATA128,17,0,128,17,0
 2050 DATA255,241,0,128,17,0
 CH 2060 DATA128,17,0,143,18,0
 FP 2070 DATA128,20,0,255,248,0
 KE 2080 DATA0,0,0,0,0,0
 OL 2090 DATA0,60,0,0,66,0
 2100 DATA3,255,192,4,0,32
 DI 2110 DATA3,255,192,2,0,64
 IM 2120 DATA2,82,64,2,82,64
 JC 2130 DATA2,82,64,2,82,64
 DB 2140 DATA2,82,64,2,82,64
 2150 DATA2,82,64,2,82,64
 2160 DATA2,82,64,2,0,64
 2170 DATA3,255,192,0,0,0
 2180 DATA0,0,0,0,0,0
 2190 DATA0,0,0,0,0,0
 GG 2200 DATA0,0,0,0,0,255
 2210 DATA0,3,0,192,4,60
 2220 DATA32,8,66,16,16,153
 2230 DATA8,32,189,4,16,153
 AJ 2240 DATA8,8,66,16,4,60
 2250 DATA32,3,0,192,0,255
 OK 2260 DATA0,0,0,0,0,0
 2270 DATA0,0,0,0,0,0
 2280 DATA0,0,0,0,0,0
 2290 DATA0,255,0,0,8,15
 EL 2300 DATA255,20,16,3,34,32
 2310 DATA5,62,64,9,34,255
 EK 2320 DATA241,34,128,17,0,143

IB 2330 DATA17,60,128,17,34,255
 JC 2340 DATA241,34,128,17,60,143
 FE 2350 DATA17,34,128,17,34,128
 JL 2360 DATA17,60,255,241,0,128
 JE 2370 DATA17,28,128,17,34,143
 CH 2380 DATA18,32,128,20,32,255
 LM 2390 DATA248,34,0,0,28,255
 OF 2400 DATA0,0,0,0,0,0
 JL 2410 DATA15,128,0,1,131,255
 CN 2420 DATA2,130,1,4,130,1
 PO 2430 DATA8,0,1,16,63,225
 JK 2440 DATA32,32,63,64,32,32
 PA 2450 DATA128,0,32,7,252,32
 FE 2460 DATA4,7,224,4,4,0
 JA 2470 DATA0,4,0,255,132,0
 AH 2480 DATA128,252,0,128,128,0
 FO 2490 DATA128,128,0,128,128,0
 MO 2500 DATA255,128,0,255,0,0
 AC 2510 DATA0,0,127,255,0,64
 NH 2520 DATA1,0,94,1,0,64
 KP 2530 DATA1,0,95,253,0,64
 NO 2540 DATA1,16,95,253,8,64
 FN 2550 DATA1,252,95,253,8,64
 LI 2560 DATA1,16,95,253,0,64
 GB 2570 DATA1,0,95,253,0,64
 ID 2580 DATA1,0,95,253,0,64
 JA 2590 DATA1,0,64,1,0,127
 CO 2600 DATA255,0,0,0,0,0
 JA 2610 DATA0,255,7,6,10,7
 LD 2620 REM HIRES SHAPE DATA
 GG 2630 DATA192,000,000,191,000,000,129,015
 JF 2640 DATA255,129,016,003,129,032,005,255
 OH 2650 DATA064,009,000,255,241,000,128,081
 JC 2660 DATA033,000,145,115,255,049,170,001
 BN 2670 DATA081,034,057,145,035,255,017,032
 HL 2680 DATA128,017,032,128,017,032,255,241
 JI 2690 DATA032,128,017,000,128,017,000,143
 HC 2700 DATA018,000,128,020,000,255,248,000
 HC 2710 REM ICON LOCATIONS
 HC 2720 DATA45,70,120,70,205,70,290,70,45,1
 DE 50
 GP 2730 DATA120,150,215,150
 JC
 JC
 PJ
 DD
 BB
 MC
 EP
 ID
 JC
 JC
 JC
 CC
 OP
 HM
 OD

AG
 GK
 GO
 NM
 JG
 HE
 KC
 JC
 DD
 CG
 HK
 CK
 OG
 PK
 DK
 PM
 GO
 PE
 KD
 BM
 GN
 KP
 PB
 KH
 GN
 GN
 FM
 BJ
 FD
 GG
 JN
 OK
 AM
 ND
 NJ
 AN
 FL
 PM
 HG
 BO
 FL

SCRAMBLER FROM PAGE 31

Starting address in hex: C000

Ending address in hex: CA61

SYS to start: 49152

Flankspeed required for entry! See page 95.

C000: A9 D3 A0 C5 20 1E AB 20 ED
 C008: 8D C4 A9 20 85 39 A9 CA 57
 C010: 85 3A A9 00 85 3B A9 3F 23
 C018: 85 3C A2 04 A0 3F B1 39 4B
 C020: 91 3B 88 C0 FF D0 F7 C6 C5
 C028: 3A C6 3C CA D0 F0 A0 3F D1
 C030: A9 00 99 40 3F 88 10 FA 86
 C038: 8C 56 3F A0 18 B9 B4 C6 48

C040:	99	00	D4	88	10	F7	A2	18	F9	C210:	20	D2	FF	A5	A2	C5	A2	F0	A4
C048:	A0	02	18	20	F0	FF	A9	D7	95	C218:	FC	84	FB	20	E4	FF	C9	00	64
C050:	A0	C5	20	1E	AB	A9	00	8D	D7	C220:	D0	06	A4	FB	C8	4C	0B	C2	7A
C058:	20	D0	8D	21	D0	8D	17	D0	3E	C228:	4C	8B	C0	A2	05	18	BD	38	76
C060:	8D	1B	D0	8D	1D	D0	A9	7F	7E	C230:	C6	7D	2A	C6	A8	BD	3F	C6	D1
C068:	8D	1C	D0	A9	0A	8D	27	D0	1C	C238:	7D	31	C6	85	FB	D0	0A	C0	CA
C070:	A9	07	8D	25	D0	A9	09	8D	E4	C240:	28	B0	0A	20	5F	C2	4C	5B	0D
C078:	26	D0	A9	01	8D	2E	D0	78	1F	C248:	C2	C0	32	B0	F6	AD	1B	D4	43
C080:	A9	DD	8D	14	03	A9	C4	8D	A8	C250:	F0	F1	98	9D	38	C6	A5	FB	0A
C088:	15	03	58	A9	33	8D	D7	07	42	C258:	9D	3F	C6	CA	10	CF	60	AD	B4
C090:	20	C7	C3	A9	11	8D	20	C6	6B	C260:	1B	D4	29	07	A8	B9	6A	C6	14
C098:	A9	01	8D	1F	C6	20	F4	C3	8F	C268:	9D	2A	C6	B9	72	C6	9D	31	B8
C0A0:	A9	00	85	FE	8D	26	C6	8D	D6	C270:	C6	60	AD	0F	D0	D0	45	AD	E8
C0A8:	27	C6	8D	22	C6	8D	28	C6	89	C278:	1B	D4	D0	6A	AD	23	C6	A2	DD
C0B0:	8D	29	C6	8D	04	D4	8D	0B	2D	C280:	05	DD	7E	C6	F0	04	CA	10	78
C0B8:	D4	8D	0F	D0	8D	25	C6	A9	1E	C288:	F8	60	8D	0F	D0	A0	01	78	69
C0C0:	DE	8D	23	C6	A2	05	8A	0A	53	C290:	38	BD	38	C6	8D	3E	C6	ED	06
C0C8:	A8	BD	7E	C6	99	03	D0	AD	8F	C298:	24	C6	BD	3F	C6	8D	45	C6	E0
C0D0:	1B	D4	09	08	9D	28	D0	09	71	C2A0:	ED	25	C6	90	01	88	58	B9	A6
C0D8:	B0	9D	38	C6	A9	00	9D	3F	AC	C2A8:	7A	C6	8D	30	C6	B9	7C	C6	6B
C0E0:	C6	A9	FC	9D	F9	07	20	5F	6C	C2B0:	8D	37	C6	A0	54	8C	0B	D4	9D
C0E8:	C2	CA	10	DA	20	4E	C3	A9	3D	C2B8:	C8	8C	0B	D4	18	AD	3E	C6	B8
C0F0:	FD	8D	FF	07	A9	FF	8D	15	CF	C2C0:	6D	30	C6	A8	AD	45	C6	6D	F4
C0F8:	D0	A2	14	8E	24	C6	18	A5	B7	C2C8:	37	C6	30	06	F0	0A	C0	55	0E
C100:	A2	69	02	C5	A2	D0	FC	8A	CE	C2D0:	90	06	A9	00	8D	0F	D0	60	DE
C108:	29	07	4A	09	F4	8D	F8	07	0E	C2D8:	8C	3E	C6	8D	45	C6	98	29	C5
C110:	E8	E0	29	90	E6	AD	1E	D0	17	C2E0:	0F	09	40	8D	08	D4	60	A9	AD
C118:	E6	FD	20	E7	C2	AD	8D	02	05	C2E8:	00	85	A7	A9	04	85	A8	38	2A
C120:	8D	1F	C6	F0	12	A9	00	8D	CD	C2F0:	AD	23	C6	E9	27	4A	4A	4A	78
C128:	18	D4	AD	8D	02	D0	FB	8D	AC	C2F8:	A8	F0	10	18	A5	A7	69	28	99
C130:	1F	C6	A9	8F	8D	18	D4	AD	77	C300:	85	A7	A5	A8	69	00	85	A8	13
C138:	22	C6	F0	09	CE	22	C6	20	F2	C308:	88	D0	F0	78	38	AD	24	C6	9B
C140:	A7	C3	4C	48	C1	20	73	C3	59	C310:	E9	11	85	FB	AD	25	C6	E9	10
C148:	20	2B	C2	20	72	C2	20	4E	1A	C318:	00	58	4A	66	FB	46	FB	46	A5
C150:	C3	A5	FD	29	07	D0	09	AD	6F	C320:	FB	A4	FB	B1	A7	85	FE	C9	64
C158:	1B	D4	8D	0A	3F	8D	1C	3F	08	C328:	45	D0	22	A9	20	91	A7	A9	0D
C160:	AE	20	C6	A0	00	C8	D0	FD	2E	C330:	00	8D	29	C6	38	A9	12	ED	8F
C168:	CA	D0	FA	AD	1E	D0	29	01	C5	C338:	20	C6	85	FB	0A	0A	18	65	32
C170:	D0	20	AD	23	C6	C9	30	B0	A3	C340:	FB	8D	22	C6	A0	40	8C	04	24
C178:	9F	AC	20	C6	88	C0	06	90	8B	C348:	D4	C8	8C	04	D4	60	A2	06	54
C180:	03	8C	20	C6	AC	D7	07	C8	4B	C350:	8A	0A	A8	BD	38	C6	99	02	E5
C188:	C0	3A	B0	03	8C	D7	07	4C	EE	C358:	D0	AD	10	D0	3D	5C	C6	A8	C0
C190:	98	C0	A9	7F	8D	15	D0	8D	14	C360:	BD	3F	C6	29	01	F0	05	98	DC
C198:	1F	C6	AD	22	C6	F0	09	CE	DD	C368:	1D	63	C6	A8	8C	10	D0	CA	90
C1A0:	22	C6	20	B2	C3	4C	9A	C1	C8	C370:	10	DE	60	AD	29	C6	F0	04	52
C1A8:	8D	04	D4	85	3A	AD	F8	07	7C	C378:	CE	29	C6	60	AC	28	C6	B9	EC
C1B0:	85	39	A0	06	06	39	26	3A	B5	C380:	CD	C6	D0	04	8D	28	C6	60	C6
C1B8:	88	D0	F9	A0	3F	B1	39	99	70	C388:	8D	29	C6	A2	40	8E	04	D4	50
C1C0:	C0	3F	88	10	F8	8C	F8	07	DE	C390:	B9	EA	C6	F0	0D	8D	01	D4	5D
C1C8:	A0	54	8C	0B	D4	C8	8C	0B	8A	C398:	B9	DC	C6	8D	00	D4	E8	8E	CF
C1D0:	D4	A0	3F	A2	00	A9	00	9D	6F	C3A0:	04	D4	C8	8C	28	C6	60	29	47
C1D8:	C0	3F	A5	A2	C5	A2	F0	FC	77	C3A8:	01	0A	0A	0A	0A	09	20	8D	88
C1E0:	18	8A	69	0B	29	3F	AA	8D	98	C3B0:	01	D4	A0	04	38	B9	C8	07	EC
C1E8:	08	D4	88	10	E8	CE	D7	07	F4	C3B8:	69	00	C9	3A	90	02	A9	30	92
C1F0:	AD	D7	07	29	0F	F0	03	4C	F5	C3C0:	99	C8	07	88	10	EF	60	A0	B3
C1F8:	98	C0	A9	00	85	C6	A2	04	EE	C3C8:	00	B9	C8	07	D9	E0	07	F0	05
C200:	A0	0E	18	20	F0	FF	EE	86	4D	C3D0:	05	B0	0B	4C	E9	C3	C8	C0	15
C208:	02	A0	00	B9	11	C6	F0	EE	1C	C3D8:	06	90	EE	4C	E9	C3	A0	05	FD

C3E0:	B9	C8	07	99	E0	07	88	10	84	C5B0:	41	B0	06	8C	24	C6	8D	25	D2
C3E8:	F7	A0	05	A9	30	99	C8	07	C9	C5B8:	C6	AD	23	C6	8D	01	D0	AD	24
C3F0:	88	10	FA	60	A9	17	85	FB	27	C5C0:	24	C6	8D	00	D0	AD	10	D0	98
C3F8:	A6	FB	20	FF	E9	C6	FB	10	78	C5C8:	29	FE	0D	25	C6	8D	10	D0	58
C400:	F7	A9	04	85	FB	A6	FB	BD	87	C5D0:	4C	31	EA	8E	08	93	00	9F	03
C408:	46	C6	85	02	85	04	BD	4B	2F	C5D8:	53	43	4F	52	45	20	05	30	AB
C410:	C6	85	03	18	69	D4	85	05	40	C5E0:	30	30	30	30	30	20	20	20	32
C418:	A0	4B	A9	41	91	02	A9	06	32	C5E8:	9C	4C	49	56	45	53	20	05	2F
C420:	91	04	88	C0	28	B0	F3	AD	79	C5F0:	33	20	20	20	1E	48	49	47	7B
C428:	1B	D4	29	23	A8	A9	45	91	8D	C5F8:	48	20	05	30	30	30	30	30	57
C430:	02	A9	05	91	04	C6	FB	10	49	C600:	30	00	97	C2	11	9D	C2	11	0D
C438:	CC	A9	07	85	FB	A6	FB	BC	96	C608:	9D	C2	11	9D	C2	11	9D	C3	4C
C440:	84	C6	BD	8C	C6	AA	18	20	7F	C610:	00	50	52	45	53	53	20	41	FF
C448:	F0	FF	A9	02	A0	C6	20	1E	8A	C618:	4E	59	20	4B	45	59	00	00	C9
C450:	AB	C6	FB	10	E8	A0	27	A9	29	C620:	00	00	00	00	00	00	00	00	20
C458:	44	99	98	07	A9	02	99	98	B3	C628:	00	00	00	00	00	00	00	00	28
C460:	DB	88	10	F3	A0	50	A9	43	A6	C630:	00	00	00	00	00	00	00	00	30
C468:	99	14	04	A9	0B	99	14	D8	55	C638:	00	00	00	00	00	00	00	00	38
C470:	38	98	E9	28	A8	10	EF	A9	A5	C640:	00	00	00	00	00	00	D2	32	45
C478:	13	20	D2	FF	A9	05	20	D2	20	C648:	92	F2	52	06	06	05	04	04	39
C480:	FF	38	A9	12	ED	20	C6	AA	F3	C650:	00	01	FF	00	00	00	FF	00	51
C488:	A9	00	4C	CD	BD	AD	0E	DC	A2	C658:	00	F4	F0	00	FD	FB	F7	EF	20
C490:	29	FE	8D	0E	DC	A5	01	29	01	C660:	DF	BF	7F	02	04	08	10	20	BD
C498:	FB	85	01	A9	D0	85	3A	A9	FE	C668:	40	80	01	FF	02	FE	03	FD	2C
C4A0:	38	85	3C	A0	00	84	39	84	7D	C670:	01	FF	00	FF	00	FF	00	FF	71
C4A8:	3B	A2	04	B1	39	91	3B	C8	0B	C678:	00	FF	FC	04	FF	00	3E	5E	16
C4B0:	D0	F9	E6	3A	E6	3C	CA	D0	5B	C680:	7E	9E	BE	DE	09	1F	14	09	80
C4B8:	F2	A5	01	09	04	85	01	AD	93	C688:	1F	14	09	1F	02	02	06	0A	F7
C4C0:	0E	DC	09	01	8D	0E	DC	AD	DB	C690:	0A	0E	12	12	FE	FE	FE	FE	C8
C4C8:	18	D0	29	F0	09	0E	8D	18	88	C698:	FF	FF	00	FF	00	FF	00	00	98
C4D0:	D0	A0	27	B9	F8	C6	99	08	84	C6A0:	FF	00	00	00	00	00	00	01	A1
C4D8:	3A	88	10	F7	60	AD	1F	C6	97	C6A8:	00	00	01	00	01	00	01	01	AC
C4E0:	F0	03	4C	B9	C5	AC	27	C6	3B	C6B0:	02	02	02	02	00	00	00	08	C0
C4E8:	D0	26	AD	00	DC	AA	29	10	4E	C6B8:	00	50	84	3E	00	C8	00	00	94
C4F0:	D0	35	AD	F8	07	C9	F8	B0	18	C6C0:	0C	00	FF	FF	00	00	80	00	4D
C4F8:	2E	A8	8A	29	0C	4A	4A	8D	B1	C6C8:	00	00	00	00	8F	14	0A	0A	80
C500:	21	C6	AA	BD	58	C6	D0	01	41	C6D0:	0A	0A	0A	0A	14	0A	0A	0A	2B
C508:	98	09	03	8D	F8	07	A0	00	DA	C6D8:	0A	0A	0A	00	47	B4	47	00	3A
C510:	18	AD	23	C6	79	94	C6	8D	22	C6E0:	47	98	47	47	B4	47	00	30	7B
C518:	23	C6	C8	98	29	1F	8D	27	60	C6E8:	47	B4	05	04	05	00	05	05	FC
C520:	C6	AE	21	C6	4C	98	C5	8A	B2	C6F0:	05	05	04	05	00	04	05	04	11
C528:	29	03	AA	AD	26	C6	D0	19	83	C6F8:	00	FF	00	7E	18	7E	00	FF	0E
C530:	BD	50	C6	F0	3E	A5	FE	E0	B9	C700:	81	BD	81	81	81	BD	81	81	84
C538:	01	D0	07	C9	42	F0	07	4C	61	C708:	81	BD	81	81	81	BD	81	81	8C
C540:	73	C5	C9	43	D0	2D	EE	26	99	C710:	00	FB	FB	00	DF	DF	00	00	C7
C548:	C6	A5	A2	29	01	D0	1C	18	86	C718:	00	3C	18	3C	7E	FF	FF	7E	A5
C550:	AD	23	C6	7D	50	C6	8D	23	2D	C720:	00	00	00	02	80	00	02	80	25
C558:	C6	A0	05	D9	7E	C6	F0	0E	E2	C728:	00	00	00	00	01	50	00	09	82
C560:	88	10	F8	29	07	4A	09	F8	6E	C730:	50	00	00	80	00	03	C0	00	C4
C568:	8D	F8	07	4C	B9	C5	A9	00	6B	C738:	03	C0	00	03	C0	00	00	C0	80
C570:	8D	26	C6	AD	00	DC	29	0C	AA	C740:	00	03	C0	00	00	00	00	00	04
C578:	4A	4A	AA	BD	58	C6	D0	0B	70	C748:	00	00	00	00	00	00	00	00	48
C580:	AD	F8	07	29	FC	8D	F8	07	E1	C750:	00	00	00	00	00	00	00	00	50
C588:	4C	B9	C5	AD	24	C6	29	0F	25	C758:	00	00	00	00	00	00	00	00	58
C590:	4A	4A	1D	58	C6	8D	F8	07	EE	C760:	00	00	00	02	80	00	02	80	65
C598:	18	AD	24	C6	7D	50	C6	A8	86	C768:	00	00	00	00	01	40	00	01	AA
C5A0:	AD	25	C6	7D	54	C6	D0	07	AA	C770:	40	00	02	00	00	00	C0	00	73
C5A8:	C0	22	90	0D	4C	B3	C5	C0	AF	C778:	03	C0	00	03	F0	00	00	F0	21

C780:	00	00	C0	00	00	00	00	00	41	C950:	00	00	00	00	00	00	00	00	50
C788:	00	00	00	00	00	00	00	00	88	C958:	00	00	00	00	00	00	00	00	58
C790:	00	00	00	00	00	00	00	00	90	C960:	00	00	00	0A	00	00	0A	00	74
C798:	00	00	00	00	00	00	00	00	98	C968:	00	20	00	00	15	00	00	05	A2
C7A0:	00	00	00	02	80	00	02	80	A5	C970:	80	00	00	00	00	0F	C0	00	C0
C7A8:	00	00	00	00	01	50	00	09	03	C978:	0C	C0	00	0C	C0	00	0C	C0	DE
C7B0:	60	00	00	00	00	0F	C0	00	E0	C980:	00	00	C0	00	00	00	00	00	41
C7B8:	0F	C0	00	0C	C0	00	3C	F0	82	C988:	00	00	00	00	00	00	00	00	88
C7C0:	00	00	30	00	00	00	00	00	F0	C990:	00	00	00	00	00	00	00	00	90
C7C8:	00	00	00	00	00	00	00	00	C8	C998:	00	00	00	00	00	00	00	00	98
C7D0:	00	00	00	00	00	00	00	00	D0	C9A0:	00	00	00	02	80	00	02	80	A5
C7D8:	00	00	00	00	00	00	00	00	D8	C9A8:	00	20	00	00	15	50	00	01	2F
C7E0:	00	00	00	02	80	00	02	80	E5	C9B0:	40	00	00	00	00	0F	C0	00	C0
C7E8:	00	00	10	00	01	54	00	25	73	C9B8:	00	C0	00	0C	C0	00	00	C0	07
C7F0:	48	00	00	00	00	03	C0	00	FC	C9C0:	00	00	C0	00	00	00	00	00	81
C7F8:	0F	C0	00	3C	FC	00	30	0C	3E	C9C8:	00	00	00	00	00	00	00	00	C8
C800:	00	F0	00	00	00	00	00	00	F0	C9D0:	00	00	00	00	00	00	00	00	D0
C808:	00	00	00	00	00	00	00	00	08	C9D8:	00	00	00	00	00	00	00	00	D8
C810:	00	00	00	00	00	00	00	00	10	C9E0:	00	00	00	02	80	00	02	80	E5
C818:	00	00	00	00	00	00	00	00	18	C9E8:	00	00	20	00	01	50	00	09	63
C820:	00	00	00	0A	00	00	0A	00	34	C9F0:	40	00	00	00	00	0F	C0	00	01
C828:	00	00	00	00	15	00	00	15	52	C9F8:	0C	C0	00	0C	C0	00	0C	C0	5F
C830:	80	00	08	00	00	0F	00	00	C7	CA00:	00	0C	00	00	00	00	00	00	0C
C838:	0F	00	00	0F	00	00	0C	00	62	CA08:	00	00	00	00	00	00	00	00	08
C840:	00	0F	00	00	00	00	00	00	4F	CA10:	00	00	00	00	00	00	00	00	10
C848:	00	00	00	00	00	00	00	00	48	CA18:	00	00	00	00	00	00	00	00	18
C850:	00	00	00	00	00	00	00	00	50	CA20:	00	00	00	00	00	00	00	AA	CA
C858:	00	00	00	00	00	00	00	00	58	CA28:	00	01	00	40	00	AA	00	00	14
C860:	00	00	00	0A	00	00	0A	00	74	CA30:	00	00	10	28	04	37	AA	DC	2B
C868:	00	00	00	00	05	00	00	05	72	CA38:	01	AA	40	3E	00	BC	03	AA	CC
C870:	00	00	02	00	00	0C	00	00	7E	CA40:	C0	FC	00	3F	CC	00	33	00	3D
C878:	0F	00	00	3F	00	00	3C	00	03	CA48:	00	00	00	00	00	00	00	00	48
C880:	00	0C	00	00	00	00	00	00	8C	CA50:	00	00	00	00	00	00	00	00	50
C888:	00	00	00	00	00	00	00	00	88	CA58:	00	00	00	00	00	00	00	00	58
C890:	00	00	00	00	00	00	00	00	90	CA60:	FF	00	60						
C898:	00	00	00	00	00	00	00	00	98										
C8A0:	00	00	00	0A	00	00	0A	00	B4										
C8A8:	00	00	00	00	15	00	00	25	E2										
C8B0:	80	00	00	00	00	0F	C0	00	01										
C8B8:	0F	C0	00	0C	C0	00	3C	F0	82										
C8C0:	00	30	00	00	00	00	00	00	F0										
C8C8:	00	00	00	00	00	00	00	00	C8										
C8D0:	00	00	00	00	00	00	00	00	D0										
C8D8:	00	00	00	00	00	00	00	00	D8										
C8E0:	00	00	00	0A	00	00	0A	00	F4										
C8E8:	00	10	00	00	55	00	00	85	D3										
C8F0:	60	00	00	00	00	0F	00	00	60										
C8F8:	0F	C0	00	FC	F0	00	C0	30	A7										
C900:	00	00	3C	00	00	00	00	00	3C										
C908:	00	00	00	00	00	00	00	00	08										
C910:	00	00	00	00	00	00	00	00	10										
C918:	00	00	00	00	00	00	00	00	18										
C920:	00	00	00	0A	00	00	0A	00	34										
C928:	00	00	20	00	15	50	00	05	B2										
C930:	00	00	00	00	00	0F	C0	00	FF										
C938:	0C	00	00	0C	C0	00	0C	00	1D										
C940:	00	0C	00	00	00	00	00	00	4C										
C948:	00	00	00	00	00	00	00	00	48										
C950:	00	00	00	00	00	00	00	00	50										
C958:	00	00	00	00	00	00	00	00	58										
C960:	00	00	00	0A	00	00	0A	00	74										
C968:	00	20	00	00	15	00	00	05	A2										
C970:	80	00	00	00	00	0F	C0	00	C0										
C978:	0C	C0	00	0C	C0	00	0C	C0	DE										
C980:	00	00	C0	00	00	00	00	00	41										
C988:	00	00	00	00	00	00	00	00	88										
C990:	00	00	00	00	00	00	00	00	90										
C998:	00	00	00	00	00	00	00	00	98										
C9A0:	00	00	00	02	80	00	02	80	A5										
C9A8:	00	20	00	00	15	50	00	01	2F										
C9B0:	40	00	00	00	00	0F	C0	00	C0										
C9B8:	00	C0	00	0C	C0	00	00	C0	07										
C9C0:	00	00	C0	00	00	00	00	00	81										
C9C8:	00	00	00	00	00	00	00	00	C8										
C9D0:	00	00	00	00	00	00	00	00	D0										
C9D8:	00	00	00	00	00	00	00	00	D8										
C9E0:	00	00	00	02	80	00	02	80	E5										
C9E8:	00	00	20	00	01	50	00	09	63										
C9F0:	40	00	00	00	00	0F	C0	00	01										
C9F8:	0C	C0	00	0C	C0	00	0C	C0	5F										
CA00:	00	0C	00	00	00	00	00	00	0C										
CA08:	00	00	00	00	00	00	00	00	08										
CA10:	00	00	00	00	00	00	00	00	10										
CA18:	00	00	00	00	00	00	00	00	18										
CA20:	00	00	00	00	00	00	00	00	AA	CA									
CA28:	00	01	00	40	00	AA	00	00	14										
CA30:	00	00	10	28	04	37	AA	DC	2B										
CA38:	01	AA	40	3E	00	BC	03	AA	CC										
CA40:	C0	FC	00	3F	CC	00	33	00	3D										
CA48:	00	00	00	00	00	00	00	00	48										
CA50:	00	00	00	00	00	00	00	00	50										
CA58:	00	00	00	00	00	00	00	00	58										
CA60:	FF	00	60																

PIEMAN FROM PAGE 15

Starting address in hex: C000

Ending address in hex: CA22

SYS to start: 49152

Flank speed required for entry! See page 95.

C000:	20	CB	C4	20	CC	C7	20	7F	05
C008:	C0	A9	00	8D	00	DC	20	3D	3A
C010:	C1	AD	00	DC	C9	6F	D0	F6	5D
C018:	A2	00	A9	2D	9D	9E	07	A9	7E
C020:	0E	9D	9E	DB	E8	E0</			

C070:	00	DC	C9	6F	D0	F9	20	CB	3D	C240:	8C	C2	4C	63	C2	AD	A7	C1	19
C078:	C4	20	CC	C7	4C	29	C0	A2	CA	C248:	F0	03	4C	85	C2	A9	00	8D	08
C080:	00	BD	0E	CA	9D	9E	07	A9	04	C250:	49	C3	20	2E	C4	20	57	C4	AC
C088:	01	9D	9E	DB	E8	E0	13	D0	4F	C258:	A9	E2	8D	FA	07	A9	01	8D	AC
C090:	F0	60	A5	A2	69	02	C5	A2	FD	C260:	A7	C1	60	A9	01	8D	49	C3	6F
C098:	D0	FC	60	00	AD	E1	05	EE	4A	C268:	18	AD	15	D0	09	01	8D	15	C0
C0A0:	9B	C0	C9	20	F0	3A	EE	E1	E2	C270:	D0	AD	04	D0	8D	00	D0	18	3A
C0A8:	C0	AD	E1	C0	20	D9	C0	8D	02	C278:	AD	05	D0	69	08	8D	01	D0	CC
C0B0:	E1	C0	EE	E6	C0	AD	E6	C0	3F	C280:	A9	E3	8D	FA	07	A9	00	8D	D4
C0B8:	20	D9	C0	8D	E6	C0	EE	EB	83	C288:	1E	D0	60	01	01	00	AD	1B	A2
C0C0:	C0	AD	EB	C0	20	D9	C0	8D	24	C290:	D4	C9	2C	90	F9	C9	E6	B0	47
C0C8:	EB	C0	EE	F0	C0	AD	F0	C0	75	C298:	F5	8D	8D	C2	60	00	00	AD	7A
C0D0:	20	D9	C0	8D	F0	C0	4C	E0	F7	C2A0:	9D	C2	C9	DE	F0	41	CE	06	B0
C0D8:	C0	C9	40	D0	02	A9	3C	60	BC	C2A8:	D0	AD	06	D0	C9	33	B0	08	B3
C0E0:	A9	3C	8D	E1	05	A9	3D	8D	AF	C2B0:	EE	07	D0	A9	E1	8D	FB	07	93
C0E8:	E2	05	A9	3E	8D	09	06	A9	FE	C2B8:	EE	9D	C2	AD	9D	C2	C9	DE	BE
C0F0:	3F	8D	0A	06	A9	03	8D	05	0D	C2C0:	D0	20	AD	8B	C2	C9	00	F0	68
C0F8:	D4	8D	06	D4	A9	EF	8D	17	74	C2C8:	03	20	9C	C0	18	AD	15	D0	F4
C100:	D4	A9	2F	8D	18	D4	A0	0A	D2	C2D0:	09	08	8D	15	D0	A9	6B	8D	F7
C108:	A9	21	8D	04	D4	A9	05	8D	75	C2D8:	07	D0	A9	F5	8D	06	D0	4C	01
C110:	01	D4	8C	16	D4	A2	00	E8	E8	C2E0:	E7	C2	C9	6E	B0	01	60	AD	83
C118:	E0	00	D0	FB	A9	20	8D	04	21	C2E8:	9E	C2	C9	DE	F0	39	CE	08	F3
C120:	D4	18	98	69	05	A8	C0	6E	EB	C2F0:	D0	AD	08	D0	C9	33	B0	08	FD
C128:	D0	DE	A9	8F	8D	18	D4	A9	35	C2F8:	EE	09	D0	A9	E1	8D	FC	07	DE
C130:	00	8D	17	D4	8D	04	D4	20	30	C300:	EE	9E	C2	AD	9E	C2	C9	DE	08
C138:	9A	C4	60	00	00	EE	3B	C1	E3	C308:	D0	3E	AD	8C	C2	C9	00	F0	CE
C140:	AD	3B	C1	C9	04	D0	34	A9	67	C310:	03	20	9C	C0	18	AD	15	D0	3C
C148:	00	8D	3B	C1	AD	3C	C1	F0	6F	C318:	09	10	8D	15	D0	A9	6B	8D	47
C150:	2B	CE	3C	C1	A2	00	BD	1A	C2	C320:	09	D0	A9	F5	8D	08	D0	18	18
C158:	C9	9D	00	04	9D	50	04	E8	9E	C328:	AD	15	D0	09	18	8D	15	D0	50
C160:	E0	28	D0	F2	A9	3B	8D	28	C7	C330:	A9	01	8D	8B	C2	8D	8C	C2	93
C168:	04	A9	3A	8D	4F	04	A2	00	D3	C338:	A9	00	8D	9D	C2	8D	9E	C2	BE
C170:	BD	BB	C9	9D	6D	05	E8	E0	8D	C340:	A9	E0	8D	FB	07	8D	FC	07	EC
C178:	1A	D0	F5	60	EE	3C	C1	A2	49	C348:	60	00	00	AD	00	DC	8D	4A	0B
C180:	00	BD	42	C9	9D	00	04	9D	89	C350:	C3	29	01	D0	03	20	86	C3	7C
C188:	50	04	E8	E0	28	D0	F2	A9	3C	C358:	AD	4A	C3	29	02	D0	03	20	33
C190:	3A	8D	28	04	A9	3B	8D	4F	46	C360:	BA	C3	AD	4A	C3	29	04	D0	98
C198:	04	A2	00	BD	D5	C9	9D	6D	A7	C368:	03	20	E9	C3	AD	4A	C3	29	1E
C1A0:	05	E8	E0	1A	D0	F5	60	02	B2	C370:	08	D0	03	20	07	C4	AD	4A	30
C1A8:	AD	A7	C1	F0	13	C9	01	F0	7F	C378:	C3	29	10	D0	03	20	25	C4	53
C1B0:	10	CE	03	D0	AD	03	D0	C9	AE	C380:	A9	00	8D	4A	C3	60	AD	49	1D
C1B8:	E7	B0	05	A9	00	8D	A7	C1	F6	C388:	C3	D0	07	AD	05	D0	C9	70	E1
C1C0:	60	EE	03	D0	EE	03	D0	AD	54	C390:	B0	01	60	C9	D4	B0	FB	CE	BC
C1C8:	03	D0	8D	01	D0	C9	FB	90	52	C398:	05	D0	CE	05	D0	A9	E2	8D	2D
C1D0:	EF	18	AD	15	D0	09	01	8D	04	C3A0:	FA	07	AD	05	D0	C9	B4	D0	75
C1D8:	15	D0	20	8E	C2	AD	8D	C2	2E	C3A8:	05	A9	78	8D	1B	D0	AD	49	40
C1E0:	8D	02	D0	A9	02	8D	A7	C1	E3	C3B0:	C3	F0	06	CE	01	D0	CE	01	DB
C1E8:	4C	C0	C1	AD	05	D0	C9	72	77	C3B8:	D0	60	AD	05	D0	C9	6E	B0	56
C1F0:	B0	0C	AD	1E	D0	C9	0C	F0	11	C3C0:	01	60	C9	D2	B0	FB	EE	05	5F
C1F8:	1A	C9	14	F0	2F	60	AD	05	24	C3C8:	D0	EE	05	D0	A9	E3	8D	FA	74
C200:	D0	C9	C8	B0	01	60	AD	1E	41	C3D0:	07	AD	05	D0	C9	B8	D0	05	B3
C208:	D0	C9	07	F0	38	A9	00	8D	0A	C3D8:	A9	7C	8D	1B	D0	AD	49	C3	33
C210:	1E	D0	60	AD	8B	C2	C9	00	25	C3E0:	F0	06	EE	01	D0	EE	01	D0	59
C218:	D0	01	60	38	AD	15	D0	E9	FF	C3E8:	60	AD	04	D0	C9	E8	90	01	10
C220:	08	8D	15	D0	A9	00	8D	8B	5E	C3F0:	60	C9	2C	90	FB	CE	04	D0	77
C228:	C2	4C	63	C2	AD	8C	C2	C9	24	C3F8:	CE	04	D0	AD	49	C3	F0	06	4E
C230:	00	D0	01	60	38	AD	15	D0	2E	C400:	CE	00	D0	CE	00	D0	60	AD	4D
C238:	E9	10	8D	15	D0	A9	00	8D	DC	C408:	04	D0	C9	E6	90	01	60	C9	49

C410:	2A	90	FB	EE	04	D0	EE	04	7D	C5E0:	03	03	03	DF	DF	FF	FF	2A	D3
C418:	D0	AD	49	C3	F0	06	EE	00	89	C5E8:	2A	26	26	FF	FF	FF	FF	FF	5F
C420:	D0	EE	00	D0	60	AD	49	C3	CB	C5F0:	FF	FF	FF	FF	FF	57	7D	7D	43
C428:	F0	00	20	EB	C1	60	A9	09	F9	C5F8:	57	7F	7F	7F	FF	57	DF	DF	E5
C430:	8D	05	D4	8D	06	D4	A9	0F	B8	C600:	DF	DF	DF	57	FF	57	7F	7F	4D
C438:	8D	18	D4	A9	21	8D	04	D4	E3	C608:	5F	7F	7F	57	FF	D7	7D	7F	92
C440:	A9	51	8D	00	D4	8D	01	D4	01	C610:	D7	FD	7D	D7	FF	02	0A	08	4F
C448:	A5	A2	69	08	C5	A2	D0	FC	38	C618:	28	20	00	00	00	AA	00	00	0B
C450:	A9	20	8D	04	D4	60	00	EE	CF	C620:	00	00	00	00	00	22	80	28	EA
C458:	56	C4	AD	56	C4	C9	19	D0	EF	C628:	20	12	A0	AA	4A	AA	98	8A	BD
C460:	08	A9	00	8D	56	C4	EE	44	ED	C630:	28	28	08	08	20	29	AA	96	1B
C468:	C0	AD	CC	06	C9	39	F0	04	A1	C638:	AA	A0	A0	0A	21	28	08	8A	0A
C470:	EE	CC	06	60	A9	30	8D	CC	C6	C640:	81	24	A8	98	80	FF	C3	D7	43
C478:	06	AD	CB	06	C9	39	F0	04	F5	C648:	D7	D7	D7	C3	FF	FF	C3	EB	43
C480:	EE	CB	06	60	A9	30	8D	CB	D4	C650:	EB	EB	EB	C3	FF	0C	0C	18	08
C488:	06	AD	CA	06	C9	39	F0	04	05	C658:	00	00	00	00	00	00	00	00	58
C490:	EE	CA	06	60	A9	30	8D	CA	E2	C660:	00	00	00	00	00	00	00	00	60
C498:	06	60	AD	6C	07	C9	39	F0	14	C668:	00	00	00	00	00	00	00	00	68
C4A0:	04	EE	6C	07	60	A9	30	8D	CE	C670:	00	00	00	00	00	00	00	00	70
C4A8:	6C	07	AD	6B	07	C9	39	F0	30	C678:	00	00	00	00	00	00	00	00	78
C4B0:	04	EE	6B	07	60	A9	30	8D	DD	C680:	00	02	AA	00	09	A6	80	0A	67
C4B8:	6B	07	AD	6A	07	C9	39	F0	3E	C688:	AA	80	00	00	00	00	00	00	B3
C4C0:	04	EE	6A	07	60	A9	30	8D	EC	C690:	00	00	00	00	00	00	00	00	90
C4C8:	6A	07	60	AD	0E	DC	29	FE	5B	C698:	00	00	00	00	00	00	00	00	98
C4D0:	8D	0E	DC	A5	01	29	FB	85	9A	C6A0:	00	00	00	00	00	00	00	00	A0
C4D8:	01	A2	00	BD	00	D0	9D	00	A8	C6A8:	00	00	00	00	00	00	00	00	A8
C4E0:	30	BD	00	D1	9D	00	31	E8	58	C6B0:	00	00	00	00	00	00	00	00	B0
C4E8:	E0	00	D0	EF	A5	01	09	04	3E	C6B8:	00	00	00	00	00	80	00	02	3B
C4F0:	85	01	AD	0E	DC	09	01	8D	A7	C6C0:	80	00	09	80	00	2A	00	00	F4
C4F8:	0E	DC	A2	00	BD	9D	C5	9D	45	C6C8:	A8	00	02	60	00	02	80	00	56
C500:	18	31	E8	E0	68	D0	F5	A2	E4	C6D0:	00	00	00	00	00	00	00	00	D0
C508:	00	BD	05	C6	9D	D8	30	BD	F5	C6D8:	00	00	00	00	00	00	00	00	D8
C510:	25	C6	9D	E0	31	E8	E0	20	95	C6E0:	00	3C	00	00	FF	00	02	AA	C9
C518:	D0	EF	A2	00	BD	45	C6	9D	E2	C6E8:	80	00	AA	00	08	28	20	20	84
C520:	D0	31	BD	4D	C6	9D	D8	31	9B	C6F0:	14	08	25	55	58	05	55	50	8A
C528:	BD	55	C6	9D	00	30	A9	18	91	C6F8:	01	55	40	01	55	40	03	FF	29
C530:	9D	F8	30	E8	E0	08	D0	E4	7E	C700:	C0	01	55	40	01	55	40	01	EE
C538:	A2	00	BD	5D	C6	9D	00	38	92	C708:	41	40	01	41	40	01	41	40	8E
C540:	E8	E0	00	D0	F5	A2	00	BD	31	C710:	01	41	40	01	71	70	03	C3	3C
C548:	5D	C7	9D	00	39	E8	E0	40	4E	C718:	C0	00	00	00	00	00	00	00	D8
C550:	D0	F5	A2	00	BD	9D	C7	9D	7A	C720:	00	3C	00	00	FF	00	02	69	C7
C558:	00	D0	E8	E0	2F	D0	F5	A2	8B	C728:	80	00	BE	00	00	28	00	00	8F
C560:	00	A9	E0	9D	F8	07	E8	E0	52	C730:	14	00	25	55	58	25	55	58	E9
C568:	08	D0	F6	A9	E2	8D	FA	07	54	C738:	29	55	68	09	55	60	03	FF	E0
C570:	A9	E4	8D	F9	07	A9	02	8D	C6	C740:	C0	01	55	40	01	55	40	01	2F
C578:	A7	C1	A9	00	8D	3C	C1	8D	A4	C748:	41	40	01	41	40	01	41	40	CE
C580:	3B	C1	8D	9D	C2	8D	9E	C2	5A	C750:	01	41	40	01	41	40	03	C3	1C
C588:	8D	49	C3	8D	9B	C0	8D	56	F0	C758:	C0	03	03	00	00	00	00	00	1F
C590:	C4	A9	01	8D	8B	C2	8D	8C	F5	C760:	00	00	00	00	00	00	00	00	60
C598:	C2	8D	44	C0	60	03	0F	3C	9C	C768:	00	00	00	00	07	83	C0	0F	C2
C5A0:	3C	FC	FC	FF	FF	FF	FF	2A	01	C770:	C7	E0	0F	C7	E0	0F	C7	E0	88
C5A8:	26	26	2A	FF	FF	F3	F3	33	3A	C778:	6F	C7	EC	3F	C7	F8	0F	83	2F
C5B0:	33	33	33	FF	FF	C0	C0	C0	8C	C780:	E0	07	01	C0	03	01	80	03	B1
C5B8:	C0	C3	CC	F0	C0	0F	0C	30	07	C788:	01	80	03	01	80	03	01	80	13
C5C0:	C0	00	00	00	00	F0	30	0C	AE	C790:	03	01	80	03	01	80	03	01	9D
C5C8:	03	00	00	00	00	03	03	03	D4	C798:	80	03	01	80	00	00	00	DC	7A
C5D0:	03	C3	33	0F	03	C0	C0	C0	1F	C7A0:	FB	3C	82	F5	6B	F5	6B	F5	14
C5D8:	C0	C0	C0	F7	F7	03	03	03	14	C7A8:	6B	F5	6B	00	00	00	1B	00	90

C7B0: 00 00 1E D8 04 1D 70 00 39
 C7B8: 78 1D 00 00 00 00 02 50
 C7C0: 07 00 04 09 07 0A 0A 07 F6
 C7C8: 07 07 07 0A A9 99 20 D2 1E
 C7D0: FF A9 93 20 D2 FF A2 00 A3
 C7D8: BD 1A C9 9D 00 04 9D 50 0A
 C7E0: 04 BD 6A C9 9D 28 04 A9 4A
 C7E8: 07 9D 28 D8 E8 E0 28 D0 51
 C7F0: E7 A2 00 BD 92 C9 9D 10 43
 C7F8: 05 BD 99 C9 9D 38 05 BD B7
 C800: A0 C9 9D 40 07 E8 E0 07 20
 C808: D0 E9 A2 00 BD A7 C9 9D 32
 C810: B1 05 BD AC C9 9D D9 05 77
 C818: BD B1 C9 9D 79 06 9D 19 25
 C820: 07 BD B6 C9 9D A1 06 E8 93
 C828: E0 05 D0 E0 A2 00 A9 07 13
 C830: 9D B0 D9 9D D8 D9 A9 02 54
 C838: 9D 10 D9 9D 38 D9 A9 05 1E
 C840: 9D 78 DA 9D A0 DA A9 04 F7
 C848: 9D 19 DB 9D 40 DB A9 01 3F
 C850: 9D C8 DA 9D 68 DB A9 03 20
 C858: 9D 3E D8 9D 47 D8 E8 E0 94
 C860: 07 D0 CB A2 00 A9 30 9D 1E
 C868: CA 06 9D 6A 07 E8 E0 03 15
 C870: D0 F5 A9 0D 8D 28 D8 8D 0A
 C878: 4F D8 A2 00 BD BB C9 9D 24
 C880: 6D 05 E8 E0 1A D0 F5 A2 40
 C888: 00 A9 2D 9D BC 04 9D E4 40
 C890: 04 9D 0C 05 9D 34 05 9D B7
 C898: 5C 05 9D 84 05 9D AC 05 70
 C8A0: 9D D4 05 9D 94 04 E8 E0 18
 C8A8: 03 D0 E0 A2 00 A9 2D 9D 74
 C8B0: 9B 07 9D C3 07 A9 0E 9D 11
 C8B8: 9B DB 9D C3 DB E8 E0 1A 51
 C8C0: D0 EB A2 26 8E 95 05 8E FD
 C8C8: 9E 05 E8 8E 96 05 8E 9F AD
 C8D0: 05 E8 8E A0 05 8E AA 05 31
 C8D8: E8 8E A1 05 8E AB 05 E8 1F
 C8E0: 8E BD 05 8E C6 05 E8 8E 04
 C8E8: C9 05 8E D3 05 A9 20 8D 76
 C8F0: AC 05 8D D4 05 A2 1B 8E 56
 C8F8: 0D 05 E8 8E 35 05 A2 2E 8D
 C900: 8E BD 04 E8 8E E5 04 A9 5B
 C908: 27 8D 5B 05 A2 00 BD EF 6D
 C910: C9 9D 00 D4 E8 E0 19 D0 FF
 C918: F5 60 3A 3B 3A 3B 3A 3B CE
 C920: 3A 3B 3A 3B 3A 3B 3A 3B F5
 C928: 3A 3B 3A 3B 3A 3B 3A 3B FD
 C930: 3A 3B 3A 3B 3A 3B 3A 3B 06
 C938: 3A 3B 3A 3B 3A 3B 3A 3B 0E
 C940: 3A 3B 3B 3A 3B 3A 3B 3A 16
 C948: 3B 3A 3B 3A 3B 3A 3B 3A 1E
 C950: 3B 3A 3B 3A 3B 3A 3B 3A 26
 C958: 3B 3A 3B 3A 3B 3A 3B 3A 2E
 C960: 3B 3A 3B 3A 3B 3A 3B 3A 36
 C968: 3B 3A 3B 20 20 01 08 0F 71

C970: 19 21 20 10 09 05 20 05 0E
 C978: 0D 10 0F 12 09 15 0D 20 02
 C980: 20 20 0F 10 05 0E 20 32 45
 C988: 34 20 08 0F 15 12 13 20 4E
 C990: 20 3A 14 0F 04 01 19 00 2C
 C998: 13 13 10 05 03 09 01 0C EC
 C9A0: 13 0D 01 13 08 05 04 0C F1
 C9A8: 05 0D 0F 0E 02 05 12 12 03
 C9B0: 19 10 09 05 13 20 13 0F 3D
 C9B8: 0C 04 20 23 24 2C 24 2C AC
 C9C0: 24 2C 24 2C 24 2C 24 2C 02
 C9C8: 24 2C 24 2C 24 2C 24 2C 0A
 C9D0: 24 25 2D 2D 2D 23 2C 24 15
 C9D8: 2C 24 2C 24 2C 24 2C 24 1A
 C9E0: 2C 24 2C 24 2C 24 2C 24 22
 C9E8: 2C 24 2C 25 2D 2D 2D 00 12
 C9F0: 00 00 00 00 00 00 00 00 F0
 C9F8: 00 00 00 00 00 00 80 00 79
 CA00: 00 80 00 00 00 00 00 8F 10
 CA08: 03 0C 0F 13 05 04 10 12 64
 CA10: 05 13 13 20 06 09 12 05 81
 CA18: 20 14 0F 20 13 14 01 12 B5
 CA20: 14 00 00 34

PLANET DUEL FROM PAGE 34

•10 GRAPHIC4,1,0:POKE3072,0 LC
 •20 COLOR0,7:COLOR4,13:COLOR1,6:COLOR2,1:
 SPRCOLOR 3,11:PUDEF"0":F\$="[3"#"].##" OO
 •30 DIM V(3),D(4),J(3),C(3),M(3),L(3),A(3
),H(3),P,A\$(16):P=52330 IC
 •40 J(1)=1:J(3)=2:D(1)=19:D(2)=90:D(3)=-1
 9:D(4)=270 OJ
 •50 FORX=1TO12:READA\$(X):NEXT:OF\$="[RVSOFF
 F]":HI\$="[RVSON]" PK
 •60 PRINT"[CLEAR][DOWN][DOWN][3" "[BLACK
]][RVSON][s U][33"[s C]"]][s I]" PN
 •70 PRINT"[3" "[RVSON][s B][RVSOFF]"TAB(
 37) "[RVSON][s B]" AE
 •80 PRINT"[3" "[RVSON][s B][RVSOFF] [RVS
 ON][c O] [c I][c I] [c *][c I] [RVSOFF]
 [RVSON][sEP][c D][c F][c *][c O][SS][c
 *][RVSOFF] [RVSON] [RVSOFF][c V][RVSON][
 c O] [c P][c P] [c H][c P] [c P] [RVSOFF]
] [RVSON][s B]" EN
 •90 PRINT"[3" "[RVSON][s B][RVSOFF] [RV
 SON] [c U][c U] [RVSOFF][sEP] [RVSON][SS
]][RVSOFF] [RVSON][c G][c C][c V] [RVSOFF
 F] [RVSON][SS][RVSOFF] [c *][RVSON] [RVS
 OFF] [RVSON][SS][RVSOFF][s C][c K][3" "
]][RVSON] [RVSOFF][4" "[RVSON][s B]" KD
 •100 PRINT"[3" "[RVSON][s B][RVSOFF] [R
 VSON] [RVSOFF][5" "[RVSON] [RVSOFF] [RV
 SON][c K][c G][RVSOFF] [RVSON] [RVSOFF]

[RVSON] [RVSOFF] [RVSON] [RVSOFF] [RVSON] [RVSOFF][5" "][RVSON] [RVSOFF][3" "][SS][RVSON][s B]"	MD	•360 J=BUMP(1):J=BUMP(1):J=BUMP(2):J=BUMP(2)	BL
•110 PRINT"[3" "][RVSON][s B][RVSOFF] [RVSON][c U] [RVSOFF][4" "][RVSON][c U][3" "][c G][RVSOFF] [RVSON] [c U] [RVSOFF] [c D][RVSON] [RVSOFF][c F][RVSON][c U] [c Y][c Y] [RVSOFF] [c D][RVSON] [RVSOFF] [c F] [SS][RVSON][s B]"	BN	•370 REM MAIN LOOP	PK
•120 PRINT"[3" "][RVSON][s B][RVSOFF]"TAB(37)"[RVSON][s B]"	AE	•380 Z=1:DO	GG
•130 PRINT"[3" "][RVSON][c Q][11"[s C]"[RVSOFF]D U E L[RVSON][12"[s C]"[c W]"	KI	•390 A=JOY(J(Z)):IFAAND15THENV(Z)=((AAND15)-1)*45:M(Z)=1+(V(Z)>180)*-2:POKE8183+Z,M(Z)+55	LI
•140 PRINT"[3" "][RVSON][s B][RVSOFF]"TAB(37)"[RVSON][s B]"	AE	•400 IFA>127THENSPIRTEZ+1,1:MOVSPRZ+1,RSPPOS(Z,.)+D(M(Z)),RSPPOS(Z,1):MOVSPRZ+1,D(M(Z)+1)#L(Z):SOUNDZ,10000,33,1,300,300,3	LH
•150 PRINT"[3" "][RVSON][s B][YELLOW][4" "BY CLEVELAND M. BLAKEMORE[4" "][BLACK][s B]"	EA	•410 MOVSPRZ,V(Z)#C(Z)	LL
•160 PRINT"[3" "][RVSON][s J][33"[s C]"[s K]"	AL	•420 Z=4-Z:J=BUMP(1):LOOPUNTILJ=6ORJ=9ORJ=5:IF(BUMP(2)AND5)<>5THEN380	LN
•170 PRINT"[DOWN]"TAB(5)"A TWO-PLAYER CONFLICT IN SPACE"	LF	•430 IFJ=6THENBEGIN:MOVSPR5,RSPPOS(3,.),RSPPOS(3,1):MOVSPR3,.#.:SPRITE5,1,2,.,.,1:SOUND2,5000,30,1,0,500,3:FORX=.TO50:NEXT:SPRITE5,.,H=RND(1)*L(1)*2+1	GG
•180 PRINT"[DOWN]"TAB(10)"PREPARE FOR COMBAT!!"	PA	•440 IFH>A(3)THENH(3)=H(3)-(H-A(3)):PRINT"[c 8]";:SYSP,.,24,33,.:PRINTUSINGF\$;H(3);:IFH(3)<=.THENJ=1:I=3:GOTO520	GF
•190 PRINT"[DOWN]"TAB(5)"PLEASE STAND BY FOR PLANETFALL"	KI	•450 GOTO380	CH
•200 FORX=3584TO3903:READA:POKEX,A:NEXT	BA	•460 BEND	BG
•210 IFPEEK(3072)=1THEN240	JI	•470 IFJ=9THENBEGIN:MOVSPR5,RSPPOS(1,.),RSPPOS(1,1):MOVSPR1,.#.:SPRITE5,1,2,.,.,1:SOUND2,5000,30,1,0,500,3:FORX=.TO50:NEXT:SPRITE5,.,H=RND(1)*L(3)*2	HP
•220 A=170:FORX=0TO320STEP3:I=(RND(1)*40)+5:DRAW 2,X,A TO X+3,170-I:A=170-I:NEXT:PAINT2,0,160	GP	•480 IFH>A(1)THENH(1)=H(1)-(H-A(1)):PRINT"[c 5]";:SYSP,.,24,12,.:PRINTUSINGF\$;H(1);:IFH(1)<=.THENJ=3:I=1:GOTO520	CP
•230 COLOR1,15:FORX=.TO99:A=RND(0)*320:B=RND(1)*130:DRAW1,A,B:NEXT:COLOR3,8:CIRCLE3,30,30,15:PAINT3,35,35:POKE3072,1	AK	•490 GOTO380	CH
•240 H(1)=100:H(3)=100:FORZ=1TO3STEP2:X=8	PG	•500 BEND	BG
•250 SYSP,.,14,.,.:PRINTCHR\$(27)"@"	FO	•510 J=0:I=1	JL
•260 A\$="CHOOSE WEAPONS":A=1:B=4:C=12:GOSUB660:L(Z)=I+5:X=X-I	HL	•520 SPRSAV5,A\$:SOUND2,5000,500,1,20,500,3:FORX=1TO8:IFX<>JTHENSPRSAVA\$,X:MOVSPRX,RSPPOS(I,.),RSPPOS(I,1):SPRITE5,1,2,.,.,1:MOVSPRX,(X-1)*45#1	IH
•270 SYSP,.,14,.,.:PRINTCHR\$(27)"@"	FO	•530 NEXT	IA
•280 A\$="PICK DEFENSIVE ARMOR":A=5:B=8:GOSUB660:A(Z)=I:X=X-I:IFX<=0THENC(Z)=1:GOTO320	LA	•540 IFJ=3THENSYSP,.,24,.,.:PRINTCHR\$(27)"Q";TAB(8)"STARPILOT TWO WINS!!";:SLEEP8:CLR:GOTO580	OM
•290 SYSP,.,14,.,.:PRINTCHR\$(27)"@"	FO	•550 IFJ=1THENSYSP,.,24,.,.:PRINTCHR\$(27)"Q";TAB(8)"STARPILOT ONE WINS!!";:SLEEP8:CLR:GOTO580	KI
•300 A\$="DECIDE ON SPACECRAFT ENGINE":A=9:B=A-1+X+(X>3)*(X-4):GOSUB660:C(Z)=I+1:X=X-I	KB	•560 SYSP,.,24,.,.:PRINTCHR\$(27)"Q";:MID-AIR COLLISION ENDS IN STALEMATE!!";:FORX=.TO150:COLOR0,(XAND15)+1:FORA=1TO50:NEXTA,X:CLR:GOTO580	MK
•310 IFXTHENH(Z)=H(Z)+X*10	FF	•570 END	IC
•320 NEXT	IA	•580 PRINTCHR\$(147):GRAPHIC0:POKE208,.,:POKE53248+21,.,:RUN20	DG
•330 FORX=0TO24:FORD=1TO50:NEXT:GRAPHIC4,0,X:NEXT:SYSP,.,24,.,.:PRINT"[c 5]SHIP#1 ERGS:[9" "][c 8]SHIP#2 ERGS:[4" "];	DL	•590 REM WEAPONS	LL
•340 MOVSPR1,100,100:SPRITE1,1,12,.,.,.:SPRITE2,0,2,.,.:M(1)=1:V(1)=90:PRINT"[c 8]";:SYSP,.,24,33,.:PRINTUSINGF\$;H(1);	OB	•600 DATA LASER TORPEDOES,PHOTON CHARGES,PLASMA TRACERS,NUCLEAR MISSILES	MI
•350 MOVSPR3,250,170:SPRITE3,1,16,.,.,.:SPRITE4,0,2,.,.:M(3)=3:V(3)=270:PRINT"[c 5]";:SYSP,.,24,12,.:PRINTUSINGF\$;H(3);	CL	•610 REM ARMOR	BG
		•620 DATA CHROMIUM PLATING,DEFLECTOR WEB,KIRLIAN FIELD,SHRELL SPHERE	CG
		•630 REM ENGINES	IN

LAPS FROM PAGE 63

```

•640 DATA ATOMICS,ION PROPULSION,TACHYON
DRIVE,HALYCON OVERTHRUSTER
•650 REM MENU
•660 SYS52330,,14,,,:PRINTTAB(20-LEN(A$)
/2);A$:PRINT:PRINT
•670 PRINTTAB(C)"PLAYER #";INT(Z/2+.6);"
(<[s C][s C]>)" :PRINTTAB(C)"$X*100:I=1
•680 SYSP,,20,C,,:PRINT;HI$;A$(A+I-1)CHR$
(27)"Q"
•690 FORJ=1TO90:NEXT
•700 J=JOY(Z/2+.6):IFJ>127THENSOUND1,2000
,10:RETURN:ELSEIFJ<>3ANDJ<>7THEN700
•710 IFJ=3THENI=I+1:IFA+I-1>BTHENI=1
•720 IFJ=7THENI=I-1:IFI<1THEN660
•730 GOTO680
•740 DATA000,000,000,000,000,000,000,000
•750 DATA000,064,000,000,096,000,000,112
•760 DATA000,000,120,000,000,124,000,000
•770 DATA127,192,000,060,063,255,255,255
•780 DATA255,255,255,254,063,252,124,063
•790 DATA255,128,056,000,000,048,000,000
•800 DATA032,000,000,000,000,000,000,000
•810 DATA000,000,000,000,000,000,000,000
•820 DATA000,000,000,000,000,000,000,000
•830 DATA000,000,000,000,000,000,000,000
•840 DATA000,000,000,000,000,000,000,000
•850 DATA000,000,000,000,000,000,000,028
•860 DATA000,000,000,000,000,000,000,000
•870 DATA000,000,000,000,000,000,000,000
•880 DATA000,000,000,000,000,000,000,000
•890 DATA000,000,000,000,000,000,000,000
•900 DATA000,000,000,000,000,000,000,000
•910 DATA000,000,000,002,000,000,006,000
•920 DATA000,014,000,000,030,000,000,062
•930 DATA000,003,254,255,252,060,255,255
•940 DATA255,127,255,255,062,063,252,001
•950 DATA255,252,000,000,028,000,000,012
•960 DATA000,000,004,000,000,000,000,000
•970 DATA000,000,000,000,000,000,000,000
•980 DATA000,000,000,000,000,000,000,000
•990 DATA000,000,000,000,000,000,000,000
•1000 DATA000,000,000,000,000,000,000,000
•1010 DATA000,000,000,000,000,000,000,028
•1020 DATA000,000,000,000,000,000,000,000
•1030 DATA000,000,000,000,000,000,000,000
•1040 DATA000,000,000,000,000,000,000,000
•1050 DATA000,000,000,000,000,000,000,000
•1060 DATA048,000,003,003,016,192,000,000
•1070 DATA000,049,003,076,000,032,000,004
•1080 DATA002,016,048,136,003,002,034,000
•1090 DATA016,000,132,000,136,003,194,000
•1100 DATA000,000,000,132,004,136,000,000
•1110 DATA000,140,192,072,000,004,000,019
•1120 DATA000,193,000,048,000,000,000,012
•1130 DATA048,012,192,003,000,000,000,000

```

DO
MC
HH
AE
NJ
GJ
FI
CI
AJ
CK
FG
JL
JE
LF
LN
HO
KD
FG
FG
FM
FG
FG
FG
PG
EG
CD
EH
BG
FK
FG
FG
OL
PM
EP
DM
LC
BM
PM
IC

```

•10 REM LAPS BY JC HILTY
•20 POKE53280,0:POKE53281,0:PRINT"[CLEAR]
"TAB(18)"[c 7]LAPS"
•30 PRINTTAB(4)"[4"[DOWN]]PLEASE WAIT[8"
." ]READING DATA"
•40 GOSUB1520
•50 PRINT"[CLEAR][GREEN]PLEASE ENTER THE
NAME OF PLAYER 1[4"." ]"
•60 PRINT"[4"." ]UP TO 10 LETTERS"
•70 INPUTA$:IFLEN(A$)>10THEN50
•80 PRINT"[CLEAR][WHITE]PLEASE ENTER THE
NAME OF PLAYER 2[4"." ]"
•90 PRINT"[4"." ]UP TO 10 LETTERS"
•100 INPUTB$:IFLEN(B$)>10THEN80
•110 GOSUB1290
•120 D=PEEK(V+30)
•130 GOSUB1150
•140 SYS850,23,8:PRINT"[YELLOW]PRESS FIRE
TO START[4"." ]"
•150 POKE49522,1:POKE49523,8:POKE49524,30
:POKE49525,23:POKE49526,23
•160 SYS49152
•170 SYS828:IFST=0THENFORT=0TO88:NEXT:GOT
0160
•180 IF(PEEK(3)AND16)>0THEN200
•190 FORT=0TO50:NEXT:GOTO160
•200 SYS850,23,8:PRINT"[23" "]"
•210 GOSUB1260
•220 POKE2040,195:POKE2042,197:LP=0
•230 POKEV+37,1:POKEV+38,2:SYS828:IFST=0T
HEN290
•240 IFPEEK(3)=1THENMP=MP+5:IFMP>300THENM
P=300
•250 IFPEEK(3)=2THENMP=MP-5:IFMP<50THENMP
=50
•260 IFPEEK(3)=4THENX1=X1-6
•270 IFPEEK(3)=8THENX1=X1+6
•280 POKEV+8,X1:SYS850,1,9:PRINT"[3" "]"
:SYS850,1,8:PRINT"[YELLOW]"MP
•290 POKEV+37,2:POKEV+38,1:TM=TM+INT(600/
MP)
•300 LP=LP+1:IFLP=100THEN390
•310 IFMP>250THENPOKE2045,194:POKEV+11,14
2:GOTO340
•320 IFMP>150THENPOKE2045,193:POKEV+11,12
2:GOTO340
•330 POKE2045,192:POKEV+11,114:GOTO340
•340 Y1=Y1+1:IFY1>130THENPOKE2046,194
•350 IFY1>150THENY1=110:POKE2046,192:GOTO
370
•360 IFY1<130ANDY1>122THENPOKE2046,193
•370 POKEV+13,Y1:IFPEEK(V+30)AND16THENGOS

```

HJ
EC
PG
FJ
NC
AF
DD
GO
AF
FK
FP
FI
FK
GO
DO
KF
EG
GP
AO
JL
FK
MP
FK
LD
LC
OG
CP
IA
IN
OP
FA
LE
BA
DN
MP
BD

UB1070	MI	•760 GOTO610	CD
•380 GOTO230	CF	•770 L(Z)=TM/10:POKES+4,128	BK
•390 IFE=0THEN410	PH	•780 ONZGOTO860,870,880,890,900,910	EL
•400 GOTO770	CK	•790 LP=0:E=0:Z=Z+1:MP=50:TM=0	NF
•410 POKE49522,2:POKE49523,0:POKE49524,38	CL	•800 SYS850,1,9:PRINT"[3"]":SYS850,1,8:	DA
:POKE49525,3:POKE49526,7:POKE2040,199	ID	PRINT"[YELLOW]"MP	IL
•420 LP=0	FH	•810 IFC\$=A\$THENC\$=B\$:GOTO830	IA
•430 POKEV+37,1:POKEV+38,2:SYS828:IFST=0T	LD	•820 C\$=A\$	MJ
HEN480	LC	•830 SYS850,1,27:PRINT"[10"]":SYS850,1,	AM
•440 IFPEEK(3)=1THENMP=MP+5:IFMP>300THENM	OG	27:PRINTC\$	KL
P=300	CP	•840 X1=164:POKEV+8,X1:POKE2045,192:POKEV	GN
•450 IFPEEK(3)=2THENMP=MP-5:IFMP<50THENMP	BI	+11,114:POKE2046,192:Y1=114:POKEV+13,Y1	GH
=50	HE	•850 D=PEEK(V+30):GOTO130	HE
•460 IFPEEK(3)=4THENX1=X1-6	OG	•860 SYS850,18,9:PRINT"[YELLOW]"L(Z):GOTO	JM
•470 IFPEEK(3)=8THENX1=X1+6	DN	790	HA
•480 IFMP>250THENPOKE2045,194:POKEV+11,13	MM	•870 SYS850,18,29:PRINT"[YELLOW]"L(Z):GOT	PB
8:X1=X1+10:GOTO510	BD	0790	GJ
•490 IFMP>150THENPOKE2045,193:POKEV+11,12	IA	•880 SYS850,19,9:PRINT"[YELLOW]"L(Z):GOTO	JK
2:X1=X1+7:GOTO510	GK	790	JC
•500 POKE2045,192:POKEV+11,114:X1=X1+4	IC	•890 SYS850,19,29:PRINT"[YELLOW]"L(Z):GOT	JB
•510 Y1=Y1+1:IFY1>130THENPOKE2046,194	BJ	0790	AB
•520 IFY1>150THENY1=110:POKE2046,192:GOTO	CH	•900 SYS850,20,9:PRINT"[YELLOW]"L(Z):GOTO	JD
540	KO	790	MM
•530 IFY1<130ANDY1>122THENPOKE2046,193	OP	•910 SYS850,20,29:PRINT"[YELLOW]"L(Z)	NH
•540 POKEV+8,X1:SYS850,1,9:PRINT"[3"]":	FP	•920 L(7)=INT((L(1)+L(3)+L(5))/3):SYS850,	EB
SYS850,1,8:PRINT"[YELLOW]"MP	LD	21,9:PRINT"[YELLOW]"L(7)	HJ
•550 POKEV+37,2:POKEV+38,1:TM=TM+INT(600/	LC	•930 L(8)=INT((L(2)+L(4)+L(6))/3):SYS850,	DG
MP):POKEV+13,Y1	OG	21,29:PRINT"[YELLOW]"L(8)	PD
•560 SYS49152:LP=LP+1:IFLP=60THEN590	CP	•940 IFL(7)>L(8)THENW\$=B\$:GOTO970	LJ
•570 IFPEEK(V+30)AND16THENGOSUB1070	CG	•950 IFL(8)>L(7)THENW\$=A\$:GOTO970	FG
•580 GOTO430	IC	•960 IFL(7)=L(8)THENW\$="TIE"	IC
•590 POKE49522,1:POKE49523,0:POKE49524,38	OF	•970 SYS850,23,16:PRINT"[c 3]"W\$	AH
:POKE49525,3:POKE49526,7:POKE2040,195	DN	•980 FORT=0TO6000:NEXT:POKEV+21,0	LK
•600 LP=0:POKE2042,200	J1	•990 PRINT"[CLEAR]"[8]"[DOWN]"A\$ "L(7):	NI
•610 POKEV+37,1:POKEV+38,2:SYS828:IFST=0T	BD	PRINT	AE
HEN660	IA	•1000 PRINTB\$ "L(8):PRINT	LJ
•620 IFPEEK(3)=1THENMP=MP+5:IFMP>300THENM	GK	•1010 PRINT"THE WINNER WAS "W\$:PRINT:PRIN	FI
P=300	BL	T	CP
•630 IFPEEK(3)=2THENMP=MP-5:IFMP<50THENMP	BJ	•1020 PRINT"[YELLOW]PLAY AGAIN Y OR N"	IJ
=50		•1030 GETJK\$:IFJK\$<>""THEN1030	PM
•640 IFPEEK(3)=4THENX1=X1-6		•1040 GETR\$:IFR\$=""THEN1040	IO
•650 IFPEEK(3)=8THENX1=X1+6		•1050 IFR\$="Y"THEN50	
•660 IFMP>250THENPOKE2045,194:POKEV+11,13		•1060 END	
8:X1=X1-10:GOTO690		•1070 FORX=0TO24:POKES+X,0:NEXT:POKES+24,	
•670 IFMP>150THENPOKE2045,193:POKEV+11,12		15:POKES+5,8:POKES+6,255:POKES+4,85	
2:X1=X1-7:GOTO690		•1080 F1=100:F2=230:FORX=1TO80:POKES,F1:P	
•680 POKE2045,192:POKEV+11,114:X1=X1-4		OKE2044,201:POKES+15,F2:POKE2044,194	
•690 Y1=Y1+1:IFY1>130THENPOKE2046,194		•1090 F2=F2-2:F1=F1*.99:NEXT:POKES+6,15	
•700 IFY1>150THENY1=110:POKE2046,192:GOTO		•1100 Y1=114:POKEV+13,Y1:X1=164:POKEV+8,X	
720		1:POKE2045,192:POKE2046,192:POKEV+11,114	
•710 IFY1<130ANDY1>122THENPOKE2046,193		•1110 TM=TM+20:MP=50:SYS850,1,9:PRINT"[3"	
•720 POKEV+8,X1:SYS850,1,9:PRINT"[3" ]":		]"":SYS850,1,8:PRINT"[YELLOW]"MP	
SYS850,1,8:PRINT"[YELLOW]"MP		•1120 D=PEEK(V+30)	
•730 POKEV+37,2:POKEV+38,1:TM=TM+INT(600/		•1130 GOSUB1260:RETURN	
MP):POKEV+13,Y1		•1140 REM INITIAL FANFARE	
•740 SYS49152:LP=LP+1:IFLP=60THENE=1:GOTO		•1150 FORX=0TO24:POKES+X,0:NEXT	
220		•1160 RESTORE	
•750 IFPEEK(V+30)AND16THENGOSUB1070		•1170 POKES+5,85:POKES+6,85:POKES+12,85:P	

CD	OKES+13,85:POKES+24,15:POKES+4,33	LA	•1480 POKEV+8,164:POKEV+9,146:POKEV+10,14	
BK	•1180 POKES+11,17	KH	0:POKEV+11,114	IL
EL	•1190 FORX=0T05	JO	•1490 POKE2046,192:POKEV+45,7:POKEV+12,15	BG
NF	•1200 READH1,N1,H2,N2:POKES+1,H1:POKES,N1	AB	7:POKEV+13,110	FF
	:POKES+8,H2:POKES+7,N2	LP	•1500 POKEV+21,127:D=PEEK(V+30)	IM
DA	•1210 IFH1=50THENFORT=0T0200:NEXT	ID	•1510 RETURN	ND
IL	•1220 FORT=0T0100:NEXT:NEXT	PM	•1520 FORX=0T05:READH1,N1,H2,N2:NEXT	LP
IA	•1230 FORX=0T024:POKES+X,0:NEXT	IM	•1530 FORX=49152T049528:READA:POKEX,A:NEX	
	•1240 RETURN	PM	T	
MJ	•1250 REM CAR SOUND	PM	•1540 FORX=12288T012926:READA:POKEX,A:NEX	IH
	•1260 FORX=0T024:POKES+X,0:NEXT		T	PA
AM	•1270 POKES,251:POKES+1,05:POKES+5,129:PO	MJ	•1550 FORX=828T0848:READA:POKEX,A:NEXT	MM
KL	KES+6,65:POKES+24,15:POKES+4,129:RETURN	HM	•1560 FORX=850T0865:READA:POKEX,A:NEXT	GD
GN	•1280 REM INITIALIZE PLAYING SCREEN		•1570 DIML(8)	IM
	•1290 MP=50:V=53248:S=54272:TM=0:X1=164:L	HD	•1580 RETURN	KH
GH	P=0:E=0:Z=1:C\$=A\$:Y1=114	OD	•1590 REM FANFARE DATA	FA
HE	•1300 PRINT"[CLEAR]":POKE53280,0:POKE5328	PH	•1600 DATA 25,30,18,209,33,135,25,30,42,6	OJ
	1,0		2,31,165,50,60,37,162,42,62,31,165	GJ
JM	•1310 PRINTTAB(4)"[WHITE]MPH[WHITE]"MP;TA	BG	•1610 DATA 50,60,37,162	GI
HA	B(21)"[WHITE]RACER [CYAN]"A\$:PRINT		•1620 REM SCROLL DATA	EL
PB	•1320 PRINTTAB(7)"[RVSON][c 7]"TAB(19)"	IO	•1630 DATA 174,114,193,224,3,144,3,76,117	CN
	"":PRINTTAB(7)"[RVSON]"TAB(19)" "TAB(31)		,192,188,114,193,140,121,193,174	CI
GJ	" "	JH	•1640 DATA 118,193,232,202,32,30,193,172,	AK
	•1330 PRINTTAB(2)"[RVSON][RVSOFF][4" "[	GO	121,193,173,119,193,201,2,208,10	KD
JK	RVSON][RVSOFF][4" "[RVSON][RVSOFF][5	GD	•1650 DATA 169,32,72,173,33,208,72,76,50,	OJ
JC	" "[RVSON][RVSOFF][5" "[RVSON][RVSO	AM	192,177,90,72,177,92,72,204	OP
JB	FF][5" "[RVSON]"		•1660 DATA 116,193,240,20,200,177,90,72,1	KB
AB	•1340 PRINTTAB(2)"[RVSON][RVSOFF][RVSON	CP	77,92,136,145,92,104,145,90,200	CE
JD	][RVSOFF][RVSON][RVSOFF][4" "[RVSO	OP	•1670 DATA 204,116,193,208,238,240,18,136	MG
MM	N][RVSOFF][RVSON][RVSOFF][RVSON][3"	BB	,177,90,72,177,92,200,145,92,104	HJ
	"[RVSOFF][RVSON][RVSOFF][RVSON][R	GN	•1680 DATA 145,90,136,204,115,193,208,238	GF
NH	VSOFF][3" "[RVSON][RVSOFF][RVSON][R	PC	,173,119,193,201,0,208,5,104,104	IC
EB	VSOFF][3" "[RVSON]"	FL	•1690 DATA 76,111,192,104,145,92,104,145,	AL
	•1350 PRINT"[RVSON][39" "]"	EF	90,236,117,193,208,160,96,172,116	DK
HJ	•1360 PRINT"[7"[DOWN]]"[CYAN][RVSON][39"	GN	•1700 DATA 193,200,189,114,193,170,32,30,	EP
DG	"]"	CP	193,173,120,193,201,2,208,19,136	IA
PD	•1370 PRINTTAB(3)"[RVSON][c 7]"A\$;TAB(18)		•1710 DATA 169,32,153,122,193,173,33,208,	LL
LJ	"[CYAN]"TAB(23)"[c 7]"B\$		153,162,193,204,115,193,208,239,240	
FG	•1380 PRINTTAB(18)"[CYAN][RVSON]"":PRINT		•1720 DATA 16,136,177,90,153,122,193,177,	
IC	TAB(3)"[c 7]LAP 1"TAB(18)"[RVSON][CYAN]		92,153,162,193,204,115,193,208,240	
AH	[RVSOFF]"TAB(23)"[c 7]LAP 1"		•1730 DATA 236,117,193,240,37,202,32,30,1	
LN	•1390 PRINTTAB(3)"[c 7]LAP 2"TAB(18)"[RVS		93,172,116,193,200,136,177,90,72	
NI	ON][CYAN][RVSOFF]"TAB(23)"[c 7]LAP 2"		•1740 DATA 177,92,32,48,193,145,92,104,14	
AE	•1400 PRINTTAB(3)"[c 7]LAP 3"TAB(18)"[RVS		5,90,32,56,193,204,115,193,208	
LJ	ON][CYAN][RVSOFF]"TAB(23)"[c 7]LAP 3"		•1750 DATA 234,236,117,193,208,221,240,46	
FI	•1410 PRINT"[c 7]AVERAGE"TAB(18)"[RVSON]		,202,206,118,193,232,32,30,193,172	
CP	[CYAN][RVSOFF][c 7]AVERAGE"		•1760 DATA 116,193,200,136,32,48,193,177,	
IJ	•1420 PRINTTAB(15)"[RVSON][CYAN] WINNER "		90,72,177,92,32,56,193,145,92	
PM	•1430 POKEV+37,1:POKEV+38,2:POKEV+43,2:PO		•1770 DATA 104,145,90,204,115,193,208,234	
IO	KEV+44,5		,236,118,193,208,221,238,118,193,232	
	•1440 POKE2040,195:POKE2041,196:POKE2042,		•1780 DATA 32,30,193,173,120,193,201,0,24	
	197:POKE2043,198:POKE2044,194		0,20,172,115,193,136,200,185,162	
	•1450 POKE2045,192:POKEV+28,15:POKEV+29,1		•1790 DATA 193,145,92,185,122,193,145,90,	
	27:POKEV+23,15		204,116,193,208,240,96,189,89,193	
	•1460 POKEV,104:POKEV+1,114:POKEV+2,56:PO		•1800 DATA 133,91,24,105,212,133,93,189,6	
	KEV+3,138		4,193,133,90,133,92,96,72,152	
	•1470 POKEV+4,200:POKEV+5,114:POKEV+6,248		•1810 DATA 24,105,40,168,104,96,72,152,56	
	:POKEV+7,138		,233,40,168,104,96,0,40,80	


```

•1820 DATA 120,160,200,240,24,64,104,144,
184,224,8,48,88,128,168,208,248 LK
•1830 DATA 32,72,112,152,192,4,4,4,4,4,4,
4,5,5,5,5,5 JG
•1840 DATA 5,6,6,6,6,6,6,6,7,7,7,7,7,2,0,
29,0,21,1,1 LD
•1850 REM SPRITE DATA IB
•1860 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,84,0,0,124,0,0,16,0,0,186,0 JK
•1870 DATA 0,255,0,0,146,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 KB
•1880 DATA 0,0 BC
•1890 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,16,0,0,186,0,0,255,0,0,146,0 GP
•1900 DATA 0,56,0,0,124,0,3,108,128,3,41,
128,3,255,128,3,57,128,3,17,128 EP
•1910 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 JH
•1920 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,6,24,96,6,126,96,7,255,224 NK
•1930 DATA 6,126,96,6,24,96,0,60,0,248,12
6,31,248,231,31,248,195,31 IO
•1940 DATA 255,195,255,255,195,255,248,25
5,31,248,126,31,248,24,31,248,0,31,0 LJ
•1950 DATA 0,0,0,0,0,3,0,0,4,0,0,48,0,0,2
40,0,1,64,0,5,0,0,60,0,0,240,0,1,64,0 KM
•1960 DATA 5,64,0,21,0,0,252,0,0,240,0,0,
192,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 KN
•1970 DATA 0,0,0,0 NG
•1980 DATA 0,0,0,0,0,3,0,0,15,0,0,21,0,0,
85,0,1,84,0,15,240,0,63,192,0,255,0 JE
•1990 DATA 3,252,0,5,80,0,21,64,0,85,64,0,
85,0,0,84,0,0,0,0,0,0,0,0,0,0,0,0,0,0 EH
•2000 DATA 0,0,0,0,0,0,0 PD
•2010 DATA 0,0,0,192,0,0,16,0,0,12,0,0,15
,0,0,1,64,0,0,80,0,0,60,0,0,15,0 EP
•2020 DATA 0,1,64,0,1,80,0,0,84,0,0,63,0,
0,15,0,0,3,0,0,0,0,0,0,0,0,0,0,0,0,0 BD
•2030 DATA 0,0,0,0,0 DH
•2040 DATA 0,0,0,192,0,0,240,0,0,84,0,0,85
,0,0,21,64,0,15,240,0,3,252,0,0,255,0 BB
•2050 DATA 0,63,192,0,5,80,0,1,84,0,1,85,
0,0,85,0,0,21,0,0,0,0,0,0,0,0,0,0,0,0 GL
•2060 DATA 0,0,0,0,0,0,0,0 PD
•2070 DATA 0,0,0,192,0,0,16,0,0,12,0,0,12
,0,0,1,64,0,0,192,0,0,192,0,0,192,0 BD
•2080 DATA 1,64,0,5,64,0,21,0,0,252,0,0,2
40,0,0,192,0,0,0,0,0,0,0,0,0,0,0,0,0,0 AH
•2090 DATA 0,0,0,0,0,0,0,0 PD
•2100 DATA 0,0,0,0,0,3,0,0,4,0,0,48,0,0,4
8,0,0,64,0,3,0,0,3,0,0,3,0,0,1,64 EJ
•2110 DATA 0,1,80,0,0,84,0,0,63,0,0,15,0,
0,3,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 IH
•2120 DATA 0,0,0,0 NG
•2130 DATA 0,0,0,76,1,0,00,128,4,32,4,32,
0,48,0,8,0,0,0,32,48,80,0,130,3,12,0 KI
•2140 DATA 0,0,4,32,0,128,0,36,0,0,0,192,

```

```

201,0,4,0,0,0,19,32,192,0,4,0,32,0,1 GH
•2150 DATA 4,192,0,0,4,8,0,0,0 NC
•2160 REM JOYSTICK DATA CP
•2170 DATA 173,0,220,41,31,73,31,133,3,17
3,1,220,73,255,133,2,5,3,133,144,96 KJ
•2180 REM JD
•2190 DATA 32,155,183,138,72,32,155,183,1
04,170,164,101,24,76,240,255 HG

```

FRACTALS FROM PAGE 20

FRACTAL MAKER

```

•1 REM ===== OM
•2 REM JD
•3 REM FRACTAL MAKER BM
•4 REM C-128 KC
•5 REM JD
•6 REM RUPERT REPORT #40 OH
•7 REM JD
•8 REM ===== OM
•9 GRAPHIC 1,1 :REM FIX BASIC BUG GK
•10 GOSUB 8000 :REM DEFINE ALL VARIABLES FH
•20 MEM=FRE(1) :REM FREE VARIABLE MEMORY MA
•30 BP=10 :REM BYTES PER POINT KH
•40 PI=3.14159265 : P2=2*PI : P0=PI/2 MM
•50 DEF FNR(X)=INT(X+.5) :REM ROUND OFF KO
•90 REM ===== IO
•100 GOSUB 9000 :REM MENU FN
•200 GOSUB 2000 :REM INITIALIZE PG
•300 GOSUB 3000 :REM WINDOW SET-UP NE
•400 GOSUB 4000 :REM GET GENERATOR HM
•500 GOSUB 5000 :REM DRAW ALL LEVELS GG
•600 GOSUB 6000 :REM SHOW MIN/MAX VALUES GH
•700 PRINT"PRESS ANY KEY FOR MENU" PF
•710 GETKEY K$ AM
•800 RUN :REM BACK TO MENU CM
•999 END :===== IK
•2000 REM ===== PA
•2010 READ N,R :REM # LINE SEGMENTS, HN
# HORIZONTAL DIVISIONS
•2020 ML=FNR(LOG(MEM/BP)/LOG(N)) :REM MAX AO
LEVEL
•2030 NP=FNR(N[UPARROW]ML) :REM # P PH
OINTS
•2040 SS=NP/N :REM SAVE INCR. HB
•2045 IF NP>6000 THEN ML=ML-1 : GOTO 2030 ON
•2050 DIM X(NP),Y(NP) :REM POINTS KC
•2060 DIM DX(N),DY(N) :REM DELTAS JA
•2070 RETURN IM
•3000 REM ===== SET UP WINDOW ===== CH
•3010 GRAPHIC 2,1,23 :REM SPLIT SCREEN EA
•3020 :REM VIEWPORT COORDINATES JC
•3030 VL=0 : VR=320 :REM LEFT,RIGHT CI

```


3040 VB=0 : VT=200 : REM BOTTOM, TOP	MK	5280 Y=-V0*SN+W0*CS+Y0 : REM ... COORDS	EJ
3050 : REM WORLD COORDINATES	HG	5290 GOSUB 7200 : REM GET SCREEN PTS	PN
3060 READ WL,WR,WB,WT : REM WORLD MIN,MAX	CG	5300 DRAW TO XP,YP	AL
3070 WL=WL/R : WR=WR/R	CD	5310 GOSUB 7100 : REM SAVE MIN/MAX	BI
3080 WB=WB/R : WT=WT/R	FD	5320 NDX=NDX+SS : REM INCR. WRITE INDEX	HH
3090 A=(VR-VL)/(WR-WL)	CM	5330 X(NDX)=X : Y(NDX)=Y : REM SAVE PT	HC
3100 B=VL-A*WL	OD	5340 XL=V : YL=W : REM NEXT LEFT PT	DP
3110 C=(VT-VB)/(WT-WB)	FK	5350 ::NEXT SB	MF
3120 D=VB-C*WB	OD	5360 X=XR : Y=YR	LI
3130 XN=1E38 : YN=XN : REM ACTUAL MIN	MO	5370 GOSUB 7200 : REM CONVERT	GA
3140 XX=-1E38 : YX=XX : REM ACTUAL MAX	NM	5380 DRAW TO XP,YP : REM LAST SUBSEG	PL
3150 RETURN	IM	5390 XL=XR : YL=YR : REM NEXT SEG LEFT PT	EK
4000 REM ===== GET GENERATOR =====	PG	5400 ::NEXT SG	JC
4010 REM -- GENERATOR ENDPOINTS --	HH	5410 IF LEVEL<ML THEN PRINT "PRESS ANY KE	BP
4020 X(0)=0 : Y(0)=0	LH	Y FOR -NEXT LEVEL-	
4030 X(NP)=1 : Y(NP)=0	NL	5420 IF LEVEL>=ML THEN PRINT "PRESS ANY K	PJ
4040 REM -- GENERATOR MIDPOINTS --	LI	EY FOR ACTUAL SCREEN SIZES"	
4050 FOR J=SS TO NP-1 STEP SS	KG	5430 GETKEY K\$	AM
4060 READ X,Y	GJ	5440 :NEXT LEVEL	EN
4070 X(J)=X/R : Y(J)=Y/R	GI	5450 RETURN	IM
4080 NEXT J	MM	6000 REM ===== DISPLAY MIN/MAX =====	MC
4090 REM -- CALCULATE DELTAS --	MB	6010 GRAPHIC 0,1	GK
4100 FOR J=1 TO N	JI	6020 PRINT "# VS ": XMIN,XMAX,YMIN,YMAX	GA
4110 DX(J)=X(J*SS)-X((J-1)*SS)	DL	:	
4120 DY(J)=Y(J*SS)-Y((J-1)*SS)	CG	6030 FM\$="[3"#[3" "][3"#[3" "]	GH
4130 NEXT J	MM	[3"#[3" "][3"#[3" "].##"	
4140 RETURN	IM	6040 PRINT USING FM\$;XN*R,XX*R,YN*R,YX*R	FA
5000 REM ===== DRAW ALL LEVELS =====	JG	6050 RETURN	IM
5010 :FOR LEVEL=1 TO ML	FM	7000 REM ----- SUBROUTINES -----	AC
5020 IS=FNR(N[UPARROW](LEVEL-1)) :RE	FP	7010 REM -- FIND SEGMENT ANGLE --	ME
M INIT # SEGS		7020 IF DX=0 THEN AN=PI-(DY<0)*PI : GOTO	HD
5030 FS=FNR(N[UPARROW]LEVEL) : REM	DB	7060	CI
FINAL # SEGS		7030 AN=ATN(DY/DX)	JB
5040 SR=NP/IS : REM READ INCREMENT	NJ	7040 IF DX<0 THEN AN=AN+PI : GOTO 7060	LG
5050 SS=NP/FS : REM WRITE INCREMENT	BK	7050 IF DY<0 THEN AN=AN+PI	IM
5060 K\$="" : GET K\$: IF K\$<>"" THEN 5060	DJ	7060 RETURN	BB
5070 SCNCLR 2 : PRINT "# VS ": LEVEL ="	LA	7100 REM -- FIND MIN/MAX VALUES --	JH
LEVEL "OF" ML "; # PTS. =" FS+1	GC	7110 IF X<XN THEN XN=X	JN
5080 XL=X(0) : YL=Y(0) : REM LEFT ENDPT.	JE	7120 IF X>XX THEN XX=X	JF
5090 X=XL : Y=YL	GA	7130 IF Y<YN THEN YN=Y	JL
5100 GOSUB 7200 : REM CONVERT	ML	7140 IF Y>YX THEN YX=Y	IM
5110 DRAW 1,XP,YP : REM INITIAL PT.	BD	7150 RETURN	AN
5120 REM -- STEP THRU EACH SEGMENT --	HK	7200 REM -CONVERT X,Y TO SCREEN COORDS -	IO
5130 ::FOR SG=SR TO NP STEP SR	OF	7210 XP=A*X+B	OI
5140 XR=X(SG) : YR=Y(SG) : REM RT. ENDPT	JB	7220 YP=200-C*Y-D	DC
5150 DX=XR-XL : DY=YR-YL : REM DELTAS	LP	7230 IF XP>VR THEN XP=VR	DA
5160 L=SQR(DX*DX + DY*DY) : REM SEG LNTH.	EI	7240 IF XP<VL THEN XP=VL	EK
5170 GOSUB 7010 : REM GET ANGLE	DB	7250 IF YP>VT THEN YP=VT	CI
5180 CS=COS(P2-AN) : SN=SIN(P2-AN)	CA	7260 IF YP<VB THEN YP=VB	IM
5190 NDX=SG-SR : REM WRITE INDEX	GN	7270 RETURN	CH
5200 X0=XL : Y0=YL : REM SEG. ORIGIN	AM	7300 REM --- STOP OR CONTINUE ---	OI
5210 GET K\$: IF K\$<>"" THEN GOSUB 7300	FM	7310 PRINT "<C>ONTINUE OR <M>ENU?"	NH
5220 REM -- STEP THRU EACH SUBSEGMENT --	IC	7320 GETKEY K\$: IF K\$="M" THEN RUN	JC
5230 ::FOR SB=1 TO N-1	OM	7330 PRINT "# VS ": LEVEL =" LEVEL "OF"	IM
5240 V=XL+L*DX(SB)	OL	ML "; # PTS. =" FS+1	DK
5250 W=YL+L*DY(SB)	JE	7340 RETURN	
5260 V0=V-X0 : W0=W-Y0 : REM TRANSLATE	MG	8000 REM ----- DEFINE ALL VARIABLES --	
5270 X=V0*CS+W0*SN+X0 : REM ACTUAL ...		8010 X=0:Y=0:XL=0:YL=0:XR=0:YR=0:L=0:V=0	


```

:W=:V=:W=:CS=:SN=:N=:
.8020 X=:Y=:XP=:YP=:NDX=:SS=:SB=:
: XN=:XX=:YN=:YX=:A=:
.8030 B=:C=:D=:VR=:VL=:VT=:VB=:DX=:
: DY=:SG=:AN=:PI=:VS=:
.8040 WL=:WR=:WT=:WB=:J=:IS=:FS=:S
R=:K$="":LEVEL=:FM$=""
.8050 RETURN
.9000 REM ===== MENU =====
.9010 GRAPHIC 0,1
.9020 PRINT"1. TWIDDLES"
.9030 PRINT"2. ZIG-ZAG"
.9040 PRINT"3. PYRAMIDS"
.9050 PRINT"4. KITE TAIL"
.9060 PRINT"5. BLUEPRINT"
.9070 PRINT"6. ORTHOGONALITY"
.9080 PRINT"7. DIADEM"
.9090 PRINT"8. RORSCHACH"
.9100 PRINT"9. LACE"
.9110 NUMSEL=9 :REM # OF SELECTIONS
.9120 PRINT
.9130 PRINT "SELECT AN ITEM # OR PRESS
<Q> TO QUIT"
.9140 GETKEY SS$ : IF SS$="Q" THEN END
.9150 VS=VAL(SS$)
.9160 IF VS<1 OR VS>NUMSEL THEN 9130
.9170 DL=10000+VS*100 :REM DATA LINE #
.9180 RESTORE DL :REM SET READ PTR.
.9190 RETURN
.9900 REM =====
.9980 REM --- DATA STRUCTURE ---
.9990 REM -DO NOT CHANGE LINE NUMBERS-
.10000 REM
.10020 DATA N,R [# GENERATOR SEGMENTS, #
HORIZONTAL DIVISIONS]
.10040 DATA XMIN, XMAX, YMIN, YMAX [IMAGE
SIZE: XN, XX, YN, YX]
.10060 DATA X1,Y1, X2,Y2, ... [N-1 GENER-
ATOR MIDPTS. OMIT 0,0 AND R,0 ENDPts.]
.10080 REM
.10100 REM - FRACTAL 1
.10120 DATA 8,4
.10140 DATA 0,4.2,-1.4,1
.10160 DATA 1.2,0, 1.2,.8, 1.8,.8, 1.8,0,
1,0, 2,-1, 3,-1
.10180 REM
.10200 REM - FRACTAL 2
.10220 DATA 10,6
.10240 DATA -.2,6.2,-3,2.2
.10260 DATA 1,1, 2,2, 3,1, 4,0, 3,-1, 2,0,
2,-1, 2,-2, 5,-1
.10280 REM
.10300 REM - FRACTAL 3
.10320 DATA 8,4
.10340 DATA 0,4, -.5,1.5
.10360 DATA 1,0, 2,0, 1,1, 2,1, 3,1, 2,0,
3,0
.10380 REM
NJ .10400 REM - FRACTAL 4
.10420 DATA 7,3
CB .10440 DATA 0,3,-1.4,1.4
.10460 DATA 1,0, 2,1, 2,0, 1,0, 1,-1, 2,0
PP .10480 REM
.10500 REM - FRACTAL 5
NB .10520 DATA 7,3
IM .10540 DATA -3,3.5,-1.5,4.9
MB .10560 DATA 0,2, 2,2, 2,1, 1,1, 1,0, 2,0
GK .10580 REM
AD .10600 REM - FRACTAL 6
EJ .10620 DATA 7,5
KG .10640 DATA -.5,5,-.8,3
PN .10660 DATA 1,1, 2,2, 3,2, 4,2, 2,0, 4,0
AN .10680 REM
CI .10700 REM - FRACTAL 7
CE .10720 DATA 9,5
DO .10740 DATA 0,5,-1.5,1.5
IM .10760 DATA 1,0, 2,1, 3,1, 4,0, 1,0, 2,-1
CM , 3,-1, 4,0
JJ .10780 REM
.10800 REM - FRACTAL 8
KD .10820 DATA 10,5
FA .10840 DATA 0,5,-1.4,1.4
DN .10860 DATA 1,0, 1,1, 2,1, 2,0, 2.5,-1, 3
FJ ,0, 3,1, 4,1, 4,0
AJ .10880 REM
CA .10900 REM - FRACTAL 9
IM .10920 DATA 5,3
ME .10940 DATA 0,3,-.5,2
IN .10960 DATA 1,0, 1,1, 2,1, 2,0
FH .10980 REM
JD .11000 REM == SAVE IMAGE TO DISK ==
.11010 INPUT"SAVE IMAGE WITH WHAT FILENAM
E";FL$
KC .11020 GRAPHIC 1
FI .11040 BSAVE (FL$),P8192 TO P16191
.11060 GRAPHIC 0
HC .11070 PRINT "TO DISPLAY IMAGE, TYPE 'GOT
JD 0 12[3"0"]' "
AE .11080 END
BO .12000 REM == DISPLAY IMAGE FROM DISK ==
LG .12010 INPUT "DISPLAY WHAT FILE";FL$
.12020 GRAPHIC 1,1
OA .12030 BLOAD (FL$)
JD .12040 GRAPHIC 0
AH .12050 END
EO .13000 REM === HI-RES DUMP TO EPSON ===
DN .13010 E$=CHR$(27) : N1=200 : N2=: A$=""
.13020 OPEN 222,4 :PRINT#222,E$"A"CHR$(8)
CJ .13030 FOR COL=: TO 39
JD .13040 FOR ROW=24 TO 0 STEP -1
AG .13050 M=8192+8*COL+320*ROW
BO .13060 FOR LNE=7 TO 0 STEP -1
IO .13070 A$=A$+CHR$(PEEK(M+LNE))
.13080 NEXT LNE : NEXT ROW
IN .13085 FOR DUP=1 TO 2
JD .13090 PRINT#222,E$"K"CHR$(N1)CHR$(N2)A$; DO

```


IMPORTANT! Letters on white background are **Bug Repellent** line codes. Do not enter them! Pages 93 and 94 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

•13095 PRINT#222,CHR\$(141); : NEXT DUP :
PRINT#222
•13100 A\$="" : NEXT COL
•13110 PRINT#222 : CLOSE 222 : END

BC
BJ
GL

EXTENDED BACKGROUND MODE FROM PAGE 82

•10 BANK15:SUM=0:FORI=6144TO6466:READJ:PO
KEI,J:SUM=SUM+J:NEXT:IFSUM<>32280THENPRI
NT"ERROR IN DATA":END

IK
HD
OG
DM

•20 SYS6144
•6144 DATA 160,5,185,36,25,153,12,3
•6152 DATA 136,16,247,169,0,141,67,25
•6160 DATA 96,133,2,160,42,169,25,32
•6168 DATA 226,67,144,7,105,166,162,0
•6176 DATA 24,144,3,56,165,2,76,33
•6184 DATA 67,201,43,144,4,56,76,205
•6192 DATA 81,56,233,39,170,160,255,202
•6200 DATA 48,8,200,185,42,25,16,250
•6208 DATA 48,245,200,185,42,25,48,6
•6216 DATA 32,12,86,76,66,24,41,127
•6224 DATA 76,46,81,201,43,176,16,201
•6232 DATA 39,240,44,201,40,240,12,201
•6240 DATA 41,240,62,201,42,240,121,56
•6248 DATA 76,169,75,169,255,133,216,169
•6256 DATA 0,141,0,255,169,91,141,17
•6264 DATA 208,169,253,141,38,3,169,24
•6272 DATA 141,39,3,32,128,3,96,169
•6280 DATA 0,133,216,141,0,255,169,27
•6288 DATA 141,17,208,169,121,141,38,3
•6296 DATA 169,239,141,39,3,32,128,3
•6304 DATA 96,32,128,3,240,84,160,0
•6312 DATA 140,68,25,172,68,25,192,4
•6320 DATA 176,72,32,244,135,72,169,0
•6328 DATA 141,0,255,202,48,60,138,172
•6336 DATA 68,25,153,33,208,200,140,68
•6344 DATA 25,104,201,0,240,14,201,58
•6352 DATA 240,10,201,44,208,36,32,128
•6360 DATA 3,76,171,24,32,134,3,96
•6368 DATA 32,128,3,240,21,201,49,144
•6376 DATA 17,201,53,176,13,41,3,168
•6384 DATA 185,63,25,141,67,25,32,128
•6392 DATA 3,96,76,108,121,201,32,144

IK
HD
OG
DM
JI
HF
PG
HI
FM
FG
KN
GJ
KC
OF
BJ
KG
AP
JG
FK
EH
JC
LN
CO
HI
JE
PA
CB
DM
BB
FC
JD
KJ
IE
EJ

•6400 DATA 32,201,128,144,4,201,160,144
•6408 DATA 24,72,173,67,25,240,17,16
•6416 DATA 11,169,128,133,243,173,67,25
•6424 DATA 41,1,240,4,104,9,128,72
•6432 DATA 104,76,121,239,17,24,41,24
•6440 DATA 83,24,69,88,84,79,70,198
•6448 DATA 69,88,84,79,206,69,88,84
•6456 DATA 67,79,204,69,88,212,0,129
•6464 DATA 0,1,128

EM
IE
KN
MC
JD
BI
JH
BC
NA

LIST FORMATTER FROM PAGE 85

•100 REM LIST FORMATTER --SHAWN K. SMITH ED
•110 S=5555:REM RELOCATABLE PROGRAM - 'S' BK
•120 PRINT:PRINT"[RVSON][CLEAR][DOWN]LIST
FORMATTER "; CO
•130 REM LIST FORMATTER ML CODE 64-BYTES AK
•140 DATA 173,007,003,201,028,144,006,169 FJ
•150 DATA 203,162,021,208,004,169,081,162 EP
•160 DATA 081,141,006,003,142,007,003,096 LA
•170 DATA 008,201,058,208,026,036,017,048 BN
•180 DATA 022,169,013,032,012,086,162,000 MN
•190 DATA 189,000,001,240,008,169,032,032 LL
•200 DATA 012,086,232,208,243,169,058,201 CP
•210 DATA 143,208,002,133,243,040,234,076 PO
•220 REM POKE ML STARTING AT ADDR. 'S' OI
•230 FORD=STOS+63:READY:POKED,Y:T=T+Y:NEX
T:T=T-6277:REMARKS ARE HIGHLIGHTED!!! AK
•240 REM CHECK ML CODE FOR ERROR DL
•250 IF T THEN BEGIN: PRINT :PRINT FB
•260 PRINT"[RVSON]? CHECKSUM ERROR IN DAT
A "; CJ
•270 PRINT"LINE 140-210":END:BEND OK
•280 REM HANDLE PROGRAM RELOCATION IM
•290 L=PEEK(774):POKED,L:POKES+14,L LH
•300 H=PEEK(775):POKED+1,H:POKES+16,H FM
•310 M=S+24:L%=M/256 GH
•320 POKES+10,L%=POKES+8,M-256*L% DC
•330 SYS(S):PRINT"ENGAGED!":LIST230 AC
•340 PRINT"[RVSON]DIS/RE-ENGAGE: SYS"S PC
•350 REM KEY5,"SYS"+STR\$(S)+CHR\$(13) EK
•360 NEW : SAVE IT BEFORE U RUN IT!!!!!! GN

New number for program help:

212-239-6089

(If busy or no answer after three rings, call 212-239-0855)

This new direct line to the **Ahoy!** technical department will provide readers typing in **Ahoy!** programs with the fastest possible assistance.

Continued from page 14

TAX UPDATE

C-64 users can take advantage of the old tax laws one last time with the 1986 version of *Swifttax* (\$49.95). The program prompts you through every step of the process and checks alternatives to calculate the lowest possible tax you can pay. Supported are the most common schedules—A,B,C,D,G,SE,W, and Form 2441—the totals from which can be integrated into Forms 1040, 1040A, or 1040EZ. Information can be printed onto tax forms or blank paper.

Timeworks, 312-948-9200 (see address list, page 14).

MIDI SEQUENCER

The *Master Tracks Pro* MIDI sequencer (\$299.95), a C-128 update of Passport Designs' *Master Tracks*, supports extended memory for longer songs. The Main Sequencer and Song Mode sections now send and receive MIDI Song Position Pointer, an aid in writing film and TV scores or jingles synced to videotape.

Passport Designs, Inc., 415-726-0280 (see address list, page 14).

WORD WRITER UPGRADE

Word Writer 3 (\$49.95) includes all the features of the original C-64 word processor and adds an 85,000 word spell checker, a thesaurus with over 60,000 synonyms and antonyms, an outline processor, 80-column print preview mode, highlighting feature, headers and footers, programmable "Swiftkeys," and GEOS compatibility. The program can be used alone or interfaced with Timeworks' *Data Manager 2*, *Swiftcalc*, and *Sylvia*



Updated to prepare '86 tax return.
READER SERVICE NO. 156

Porter's Personal Financial Planner.

Timeworks, 312-948-9200 (see address list, page 14).

TEACHER'S AID

Lesson Master (\$59.95) allows teachers to develop courseware without programming knowledge. The Authoring module includes a character shape editor, sprite shape editor, sprite animator, sound and music editor, and lesson screen editor. The Presenter module lets the student play back a lesson without the little cheat being able to modify it. The File Manager module includes the usual management functions, with the capability to generate lesson summary, student progress, and master file reports.

Small Systems Software, 304-737-2891 (see address list, page 14).

PLUS/4 JOYSTICK CABLES

Interface cables that will connect standard Commodore joysticks to the Plus/4 are available for \$10 each, postage included, from R.M. Harris.

R.M. Harris (see address list, page 14).

AMIGA MUSIC PROGRAMS

Two music makers for the Amiga from Electronic Arts:

Instant Music (\$49.95) utilizes artificial intelligence by incorporating into the score a musical template that keeps the composer within his chosen key and tempo. The user can make music in real time along with the computer, playing the fourth instrument or voice while the computer plays the other three.

Deluxe Music Construction Set (\$99.95) supplies input, editing, and notation tools for easy composing. As the music is played back, the notes of the score flash and an onscreen piano follows along. Instruments and styles can be changed within each staff as desired, and playback speed can be set at 1 to 240 beats per minute. Files can be transferred to the program from *Instant Music*.

Electronic Arts, 415-571-7171 (see address list, page 14).

MODEM

The TCM-1200H Hayes Compatible Modem for the C-64 and 128 (\$179.95) features auto-select 300/1200 baud and originate answer modes, 8 LED status indicators, and 8 DIP switches (including an auto-answer disable switch to prevent the modem from answering the phone when not in use). Besides supporting the full set of Hayes AT commands, the modem is Bell 212 and CCITT V.22 compatible. C-64 and C-128 software are included.

Trans Com, Inc., 312-543-9055 (see address list, page 14).

...COMING IN THE MAY ISSUE OF AHoy! (ON SALE MARCH 31)...

KERNAL POWER

HARNESSING
THOSE MIGHTY
ROM ROUTINES

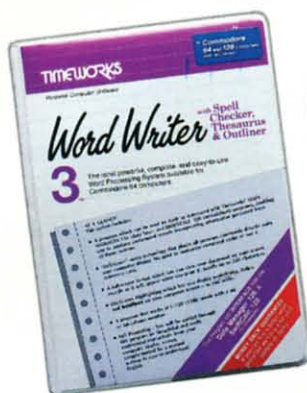
FROM DREAM TO DISK

HOW ENTERTAINMENT
SOFTWARE IS
DESIGNED TODAY

C-128 STARTUP

AUTOBOOT
MAKER AND
OTHER DOS
UTILITIES

THE LEADING C64 WORD PROCESSOR JUST GOT BETTER!



No Brag. Just Fact. WORD WRITER 3 has more features, more power, and is easier-to-use than any other C64 word processor.

And now the facts! We've added:

- **An 85,000-Word Spell Checker** — plus, unlimited sub-dictionaries.
- **An Integrated Thesaurus** with over 60,000 synonyms and alternatives.
- **An Integrated Outline Processor** that quickly organizes notes, facts, and ideas into a convenient outline format.
- **An 80-Column Print Preview Mode**
- **Highlighting:** Prints out your text incorporating underlining, **boldface**, *italics*, superscript, subscript, and more.
- **Headers and Footers**
- **Automatic Program Set-Up:** Configures WORD WRITER 3 to your choice of printer codes, screen colors, and more.
- **SwiftKeys** access commands quickly, using a minimum of keystrokes.
- ... and much, much more!

You Get Free, Ongoing Technical Support

Rest assured. When you show your support by buying Timeworks software, we never stop showing ours. That's why our twelve Customer Support Technicians have been giving our T.L.C. (Technical Loving Care) for over four years. And, all our programs have a Money Back Guarantee.



More power for your dollar

Timeworks, Inc. 444 Lake Cook Road
Deerfield, Illinois 60015 312-948-9200

* Details on every Timeworks package.

Registered trademarks of Commodore Electronics, Ltd.,
Timeworks, Inc., Berkeley Software, Inc.

© 1983 Timeworks, Inc. All Rights Reserved.

Reader Service No. 299

Word Writer 3 interfaces with Timeworks' other C64 programs for a complete Productivity System:



• DATA MANAGER 2 with Report Writer

A highly flexible filing and recordkeeping system that stores, retrieves, sorts, evaluates, and updates large amounts of information. Includes: Report Writing, Graphics, Statistics, and Label Making capabilities.

• SWIFTCALC with Sideways

A powerful, surprisingly easy-to-use electronic spreadsheet for home and business use. Plus, with Sideways, prints all your columns on one, continuous sheet — sideways!

• PARTNER 64

A cartridge-based product with eight instantly accessible desktop accessories. PARTNER operates "concurrently" with your other C64 software programs.

Available for Commodore 64/128* Computers
(64K, 40 Column)

Suggested Retail List Prices:

WORD WRITER 3	\$49.95
DATA MANAGER 2	\$39.95
SWIFTCALC	\$39.95
PARTNER 64	\$59.95

Now at your favorite dealer,
or contact Timeworks today.

To Order Call
1-800-535-9497

These Programs Are
GEOS*
Compatible

THE STANDARDS by which the others are judged...

NEW

THE EXECUTIVE DISK #1

Two new 18 hole courses for use with LEADER BOARD. Trees, sand traps, rough, water hazards.

\$19.95 C64/128 ONLY



AMIGA SCREENS

TOURNAMENT DISK #1

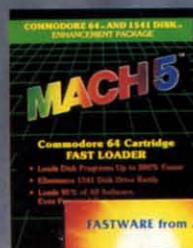
Our new 18 hole courses for use with LEADER BOARD.

\$19.95 C64/128, AMIGA ATARI ST, ATARI(48K)

MACH 5

Increase the power of your C64 and 1541 drive. Loads programs up to 500% faster. Adds easy-to-use DOS commands.

\$34.95 C64



MACH 128

All the power of MACH 5 for the C128 and C64. Features 64 and 128 select switch, warp drive and more!

\$49.95 C64 and C128

LEADER BOARD

Pro Golf Simulator

\$39.95 C64/128, AMIGA, ATARI ST, ATARI(48K)

"This game is simply amazing—there's no other word for it!"
COMPUTE'S GAZETTE

"...the next best thing to a sunny day on the fairways..."
AHOY MAGAZINE

"...the sports simulation of the year, if not the decade!"
ZZAPI 64 (U.K.)



NEW

10th FRAME

Pro Bowling Simulator

The look and 'feel' of real bowling. Up to eight players including league play.

\$39.95 C64/C128
(Coming soon for ATARI ST and AMIGA)



COMMODORE SCREENS



NEW

ROBOTIC WORKSHOP

The ultimate high-tech construction set. Discover how easy it is to build hundreds of Robotic projects and control them with your home computer.

\$149.95 C64/128
(Coming for Apple, Atari, IBM)

NEW

TRIPLE PACK

BEACHHEAD, BEACHHEAD II
RAID OVER MOSCOW

Three best selling, award winning classics! All for one incredible low price.

\$19.95 C64/128, APPLE2+/E/C, ATARI 48K

Attention Dealers!

If you wish to be included on our dealer list for new product information and special promotional material, please call 1-(800) 824-2549

ACCESS
Software Incorporated

Reader Service No. 298

If you can't find our products at your local dealer, you can order direct.

For mail orders, enclose check or money order, plus \$1.00 shipping and handling, and specify machine version desired. Order by phone on VISA, Master Charge or C.O.D. by calling (801) 298-9077.
ACCESS SOFTWARE, INC. 2561 South 1560 West
Woods Cross, UT 84087

**DON'T MISS
THE BOAT!**



**SUBSCRIBE
TO AHOY!**

- ☐ Send me twelve issues of AHOY! for \$23.00 (\$30.00 Canada & elsewhere). I understand that I will be billed later.
- ☐ Send me twenty-four issues of AHOY! for \$44.00 (\$55.00 Canada and elsewhere). I understand that I will be billed later.

NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

**DON'T MISS
THE BOAT!**



**SUBSCRIBE TO
THE AHOY!
DISK MAGAZINE**

- ☐ Send me twelve issues of the AHOY! Disk Magazine for \$97.00 (\$135.00 Canada & elsewhere). I understand that I will be billed later.
- ☐ Send me twenty-four issues of the AHOY! Disk Magazine for \$180.00 (\$250.00 Canada and elsewhere). I understand that I will be billed later.

NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

April 1987 Ahoy! Void after June 3, 1987

READER SERVICE CARD

To request additional information on any product advertised or otherwise pictured in this issue of Ahoy! that is accompanied by a reader service number, circle the corresponding number below and mail this card. We will promptly forward your request to the designated companies.

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300

A. Please check whether you are...

1. ☐ male 2. ☐ female

B. What is your age?

1. ☐ under 18 2. ☐ 18-24 3. ☐ 25-34
4. ☐ 35-44 5. ☐ 45-54 6. ☐ 55-64 7. ☐ 65+

C. Education level completed

1. ☐ elementary 2. ☐ high school
3. ☐ junior college 4. ☐ college graduate
5. ☐ master's degree 6. ☐ PhD

D. From which of the following sources did you obtain your copy of Ahoy!?

1. ☐ newsstand 2. ☐ subscription (mail)
3. ☐ from a friend or family member
4. ☐ other _____

If not currently a subscriber, do you plan to become one?

1. ☐ yes 2. ☐ no

Name _____
Street _____
City _____ State _____ Zip _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

P.O. BOX 341
MT. MORRIS, ILL. 61054



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

P.O. BOX 341
MT. MORRIS, ILL. 61054



PLACE
STAMP
HERE

AHOY! MAGAZINE

P.O. Box 2501
Clinton, Iowa 52735

Compresso

Last, a will find the distrib sor exerts 7.0 progr duty, the tally bere fluous sp number o duced to t This is a program l perfluou ing progr 256 token whole thi with a 3½ tensible p conserve

Of cou lines will resulting p sible to c grammers even with ment. If y sor, be sur original p view of th ming spac really find We suppo a VIC 20 find this v

Compre use. Simp tim to a d and turn When don intact alon sion. We line progr a matter o a two-pass the progr are displa the progr Compress and after s how well

Compre external di Disk. The two reaso RAM-Di floppy di Compress